THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LIX. No. 1502.] LONDON, FEBRUARY 23, 1892. [44TH YEAR. PRICE 6d.

GAS AND WATER PIPES.

1¼ to 12 IN. BORE.

THOMAS ALLAN & SONS,
Bon Lea Foundry,
SOUTH STOCKTON-ON-TEES.

ALSO MANUFACTURERS OF
SANITARY & RAIN-WATER PIPES, HOT WATER PIPES, STABLE FITTINGS, RANGES, STOVES, And GENERAL CASTINGS.

GLASGOW OFFICE: 24, GEORGE SQUARE.
Telegrams:
"BONLEA, STOCKTON-ON-TEES."
"SPRINGBANK, GLASGOW."

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.

THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.

WORKS:
ORMSIDE STREET, OLD KENT ROAD, LONDON.

WOLSTON'S
TORBAY PAINTS
Special Quotations to Gas Companies.
DARTMOUTH, DEVON.

CEMENT
EARLE'S
BEST
Portland Cement
MANUFACTURED BY
GEO. & THOS. EARLE,
HULL.

Offices: 7, 8, & 9, PIER STREET.
Works: WILMINGTON.
STOREAGE CAPACITY 10,000 Tons.

ESTABLISHED 1811—OVER THREE QUARTERS OF A CENTURY.
Telegraphic Address: "CEMENT HULL."

REDUCE THE COST OF PURIFICATION

By taking up 40 per cent. Carbonic Acid, 50 per cent. Sulphuretted Hydrogen, diminishing Sulphur Compounds, and removing all Ammonia and Tar,

BY THE USE OF

C. & W. WALKER'S
PATENT
PURIFYING MACHINE.

THE STATEMENTS OF VARIOUS GAS MANAGERS ARE—

"*Your Machine will clear itself in five years.*"
"*My Purifiers last as long again since your Machine was put in.*"
"*I have saved hundreds of Tons of Lime per annum since your Machine was started.*"
"*I use your Machine for the removal of CO_2. I am therefore able to save one-half of my original quantity of Lime.*"
"*Your Purifying Machine is not only a Purifying Machine in name but in Work.*"
"*Your Purifying Machine is doing 50 per cent. more than you guaranteed it to do.*"

It has proved itself by many years of work at Gas-Works. Among many others, they are in use at—

London (4).	Glasgow (2).	Wakefield.	Santiago.
Cheltenham.	Burnley.	Hornsey.	Colne.
Blackpool.	Northampton.	Mirfield.	Stafford.
Crystal Palace.	Stalybridge.	Dunfermline.	Bournemouth.
Harrogate.	Widnes.	Alloa.	Melbourne.
Stone.	Church.	Leeds (2).	Monte Video.
	Birmingham.	Brussels.	

MIDLAND IRON-WORKS, DONNINGTON, NEAR NEWPORT, SHROPSHIRE,
And 8, Finsbury Circus, London.

SAWER AND PURVES,

LATE

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER,

Manufacturers of

IMPROVED CONSUMERS' WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

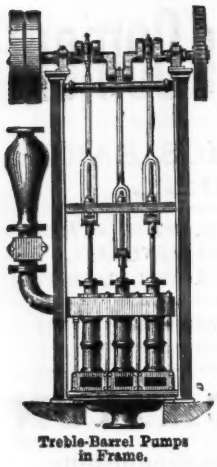
AND

IMPROVED DRY GAS-METERS.

SPECIALITY: PATENT CASH PREPAYMENT METERS.

STEAM & HAND PUMPS FOR GAS-WORKS,

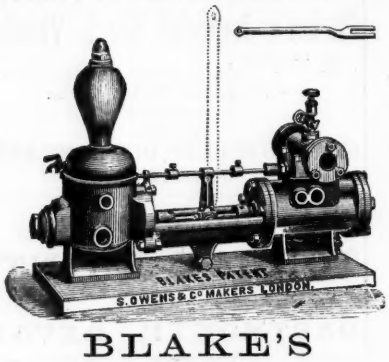
FOR PUMPING TAR, WATER, AND LIQUOR.



Treble-Barrel Pumps in Frame.

Syphon Pump.

Double-Barrel Force-Pump in Frame.



BLAKE'S
PATENT
STEAM PUMPS.
20,000 IN USE.

Improved Double Action Pump.

Cast-Iron Hand-Pump.

Wrought-Iron Portable Pump.

S. OWENS & CO., Hydraulic, Gas, & General Engineers, WHITEFRIARS ST., LONDON, E.C.

SOLE MANUFACTURERS OF

MANN & OWENS' PATENT SCREW & CAM, also FULL-WAY RACK & PINION GAS-VALVES.

S. O. and Co.'s New Catalogue of Gas Apparatus and General Machinery can be had on application.

NEWTON, CHAMBERS, & CO., LIMITED

THORNCLIFFE IRON-WORKS, near SHEFFIELD,

MANUFACTURERS OF

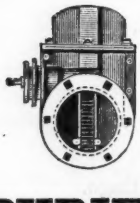
SLIDE VALVES,
WITH RACK & PINION,
OR
Internal or External
SCREWS, of all Sizes.

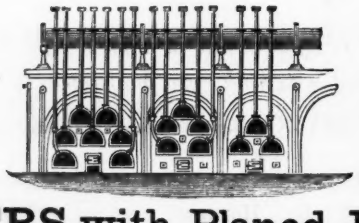
GASHOLDERS,
AND
Gasholder Tanks.

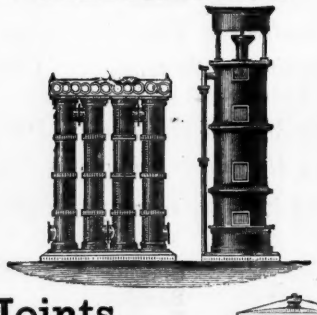
CAST-IRON RETORTS,
RETORT-BED FITTINGS,
And Retort-House Appliances
of every description.
Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

WROUGHT AND CAST IRON
CONDENSERS,
SCRUBBERS, & WASHERS,
TAR AND LIQUOR PUMPS, &c.

PATENT
CENTRE VALVES
for working Purifiers.
Also Bye-Pass & Stop Valves.







PURIFIERS with Planed Joints,
HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS,
WOOD GRIDS.
CAST AND WROUGHT IRON TANKS AND CISTERNS.

DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

THE BARROWFIELD IRON-WORKS, LIMITED,

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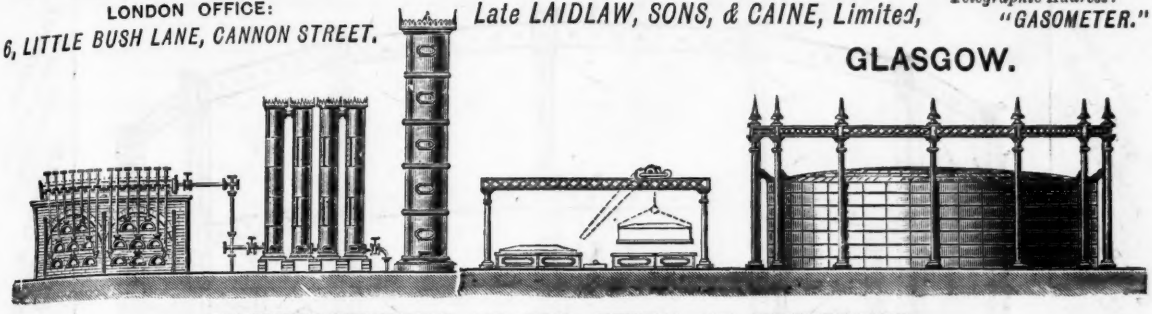
Late LAIDLAW, SONS, & CAINE, Limited,
GLASGOW.

Telegraphic Address:
"GASOMETER."



MANUFACTURERS OF ALL KINDS OF GAS PLANT.

RETORT-BENCH FITTINGS; SIEMENS'S REGENERATIVE AND ORDINARY FURNACES;
CONDENSERS, EXHAUSTERS, AND ENGINES; SCRUBBERS, WASHERS;
PURIFIERS, WITH PLANED AND CEMENT JOINTS;
DRY AND HYDRAULIC CENTRE-VALVES;
HYDRAULIC AND HAND-POWER LIFTING APPARATUS;
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STATION METERS; GOVERNORS; SCREW AND RACK VALVES;
FOUR-WAY COCKS AND HYDRAULIC VALVES;
CAST-IRON GAS, WATER, & STEAM PIPES & CONNECTIONS; WROUGHT-IRON TUBES & FITTINGS;
IRON ROOFING, MARKET BUILDINGS, BRIDGES, GIRDERS, STEAM BOILERS;
PROMENADE PIERS AND LOADING WHARVES.

MANUFACTURERS OF OIL PLANT OF EVERY DESCRIPTION.

HENDERSON'S Patent Retorts, Condensers, Stills, Cast and Wrought Iron Tanks, Ammonia Stills, Wrought-Iron Gas-Mains, &c., &c.

DESCRIPTIVE SPECIFICATIONS AND ESTIMATES ON APPLICATION.

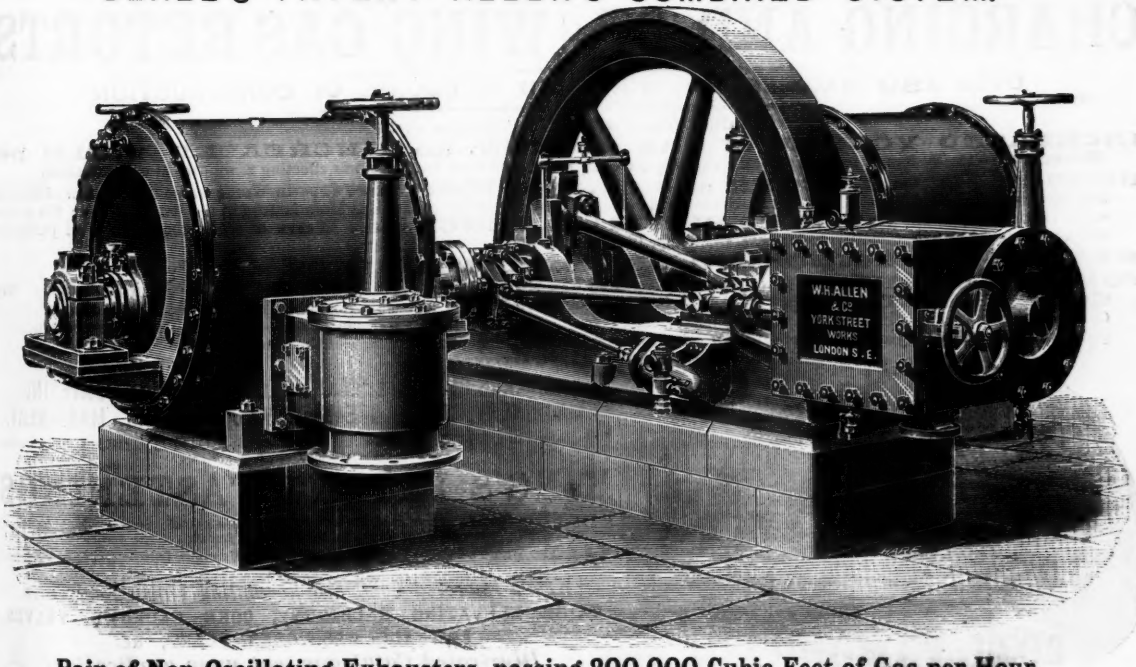
W. H. ALLEN & CO.,

York Street Works, LAMBETH, LONDON, S.E.,

MAKERS OF THE MOST IMPROVED FORM OF

GAS EXHAUSTING MACHINERY.

BEALE'S PATENT—ALLEN'S COMBINED SYSTEM.

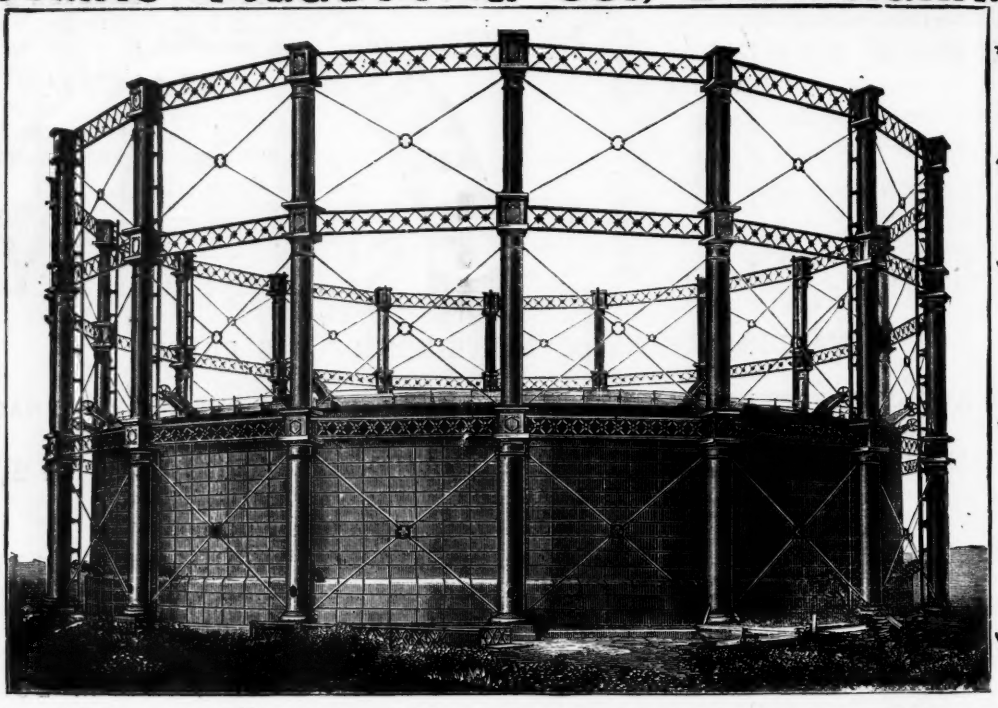


Pair of Non-Oscillating Exhausters, passing 200,000 Cubic Feet of Gas per Hour.

THOMAS PIGGOTT & CO., BIRMINGHAM.

LONDON OFFICE: ST. THOMAS APOSTLE, E.C.

GAS PLANTS, BOILERS, ENGINES, PUMPS, ROOFS, RETORT FITTINGS, ETC.



TELEGRAPHIC ADDRESS: ATLAS, BIRMINGHAM.

WELDED & RIVETED FOUL PIPES, MAINS, RETORT-LIDS, & CAST TANKS, PURIFIERS.

OVER 500 GASHOLDERS HAVE BEEN SUPPLIED AND ERECTED,

INCLUDING THOSE SUPPLIED TO THE FOLLOWING GAS COMPANIES AND CORPORATIONS:

BATH.	BOLTON.	BRISTOL.	CHELTENHAM.	LEAMINGTON.	PRESTON.	SHEFFIELD.
BELFAST.	BOMBAY.	BRISBANE.	HARTLEPOOL.	LIVERPOOL.	READING.	STOCKHOLM.
BECKTON.	BRADFORD.	CARDIFF.	LEEDS.	NOTTINGHAM.	RIO GRANDE.	SYDNEY.
BIRMINGHAM.	BRIGHTON.	COVENTRY.	LEICESTER.	OLDHAM.	SOUTH METRON.	VIENNA.

WEST'S GAS IMPROVEMENT Co., Ltd.,

Engineers, Ironfounders, & Contractors,

ALBION IRON-WORKS, MILES PLATTING, MANCHESTER,

MANUFACTURERS OF

WEST'S PATENTED MACHINERY

FOR

CHARGING AND DRAWING GAS-RETORTS.

OVER **180** MACHINES AT WORK AND IN COURSE OF CONSTRUCTION.

Advantages attending its use are:

INCREASED VOLUME of GAS per TON, and INCREASED YIELD per Retort.—The system of breaking and distributing the coals in an even layer in the retorts effecting more perfect carbonization.

REDUCTION in LABOUR and COST of WORKING.—In Works where this System of charging and drawing Retorts is adopted, there has been effected a substantial saving in the cost of Gas Manufacture in the Retort-House; the amount saved varying in different Gas-Works from **8 PENCE** to **15 PENCE per Ton** of coal carbonized. Full particulars will be forwarded upon application to W. G. I. Company, Limited.

MANUAL CHARGING AND DRAWING MACHINES.

POWER CHARGING AND DRAWING MACHINES, driven by COMPRESSED AIR, STEAM, or ROPE. The power machines are applicable to circular, oval, or Ω-shaped retorts and mouthpieces, and are the most perfect, economical, efficient, and durable machines made. They are constructed on principles founded by long and extensive experience in this special branch of gas engineering and the manufacture of gas.

MAKERS OF COAL BREAKING, ELEVATING, AND CONVEYING MACHINERY, COKE BREAKING AND WASHING MACHINERY.

Sole Makers of CIRCULAR, OVAL, or Ω-shaped MOUTHPIECES with Morton's Self-Sealing Lids, fitted with

KING'S PATENT FASTENINGS,

secure a very tight joint; and at the same time the eccentric motion given to the Lid effectually removes the Tar from the surfaces of the Joint.

N.B.—The whole of these Fittings are made of Wrought Iron. Several Thousands in use.

West's Improved Combined Regulating Liquor Seal Valve.

OXIDE ELEVATING MACHINERY, COKE BARROWS, VALVES, AND ALL GAS-WORKS PLANT, &c.

Illustrated Catalogue sent upon application.

Mr. JOHN WEST, M. Inst. C.E. *Managing Director.*

JOSEPH CLIFF & SONS,

INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.,
WORTLEY, LEEDS.

LONDON Offices & Depôts:
Baltic Wharf, Waterloo Bridge.
WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.
LIVERPOOL:
16, Lightbody Street.
LEEDS:
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MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

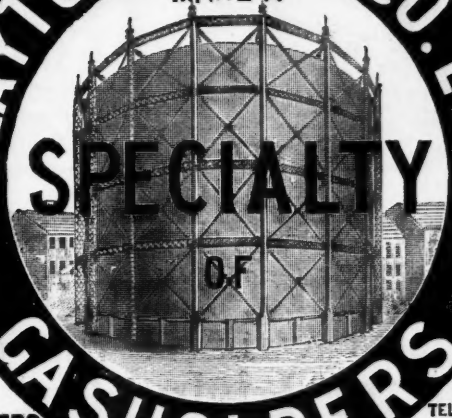
ESTABLISHED MORE THAN A QUARTER OF A CENTURY

WORKS
HUNSLET.
LEEDS

LONDON OFFICE:
60, QUEEN VICTORIA STREET
E.C.

CLAYTON SON & CO. LTD.

MAKE A



SPECIALTY OF

GASHOLDERS

AND MAKERS OF

GAS PLANT OF EVERY DESCRIPTION.

REG^D TELEGRAPHIC ADDRESS: "GAS LEEDS"

R. & J. DEMPSTER,

GAS PLANT WORKS, NEWTON HEATH, MANCHESTER,

MAKERS AND ERECTORS OF

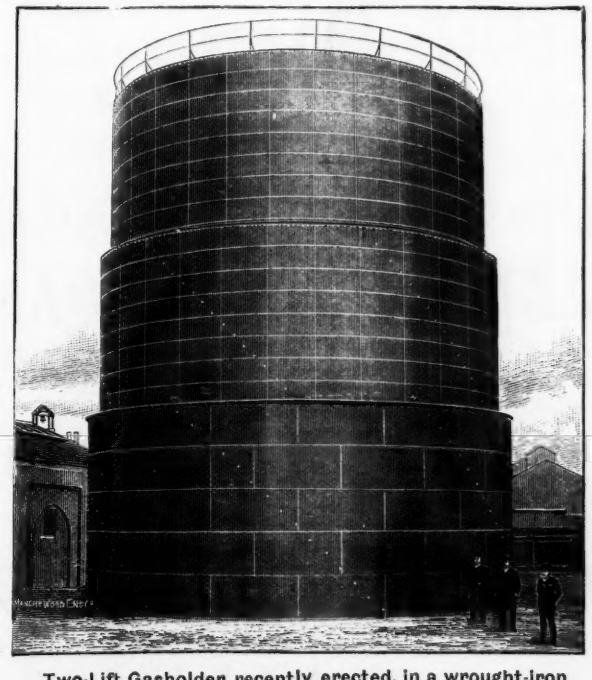
PATENT COLUMNLESS GASHOLDERS.

Telegraphic Address: "SCRUBBER MANCHESTER."

TOTAL WEIGHT REDUCED
from 30 per cent. to 50 per cent.

TRANSPORT AND ERECTION REDUCED
to the same extent; and in cases where gasholders are shipped abroad to places difficult of access, this represents a very large amount of money.

TANK CONSTRUCTION SIMPLIFIED.
The Tank wall (of whatever construction) is a regular cylinder. There are no piers needed, and all expensive foundation stones for the base of columns or standards are dispensed with.



Two-Lift Gasholder recently erected, in a wrought-iron Tank, for the Birmingham Oxygen Company, at their Works, Saltley, Birmingham. The bottom of the Tank is fixed level with the ground, upon a concrete foundation.

COST OF PAINTING SAVED
for the Columns and Girders.

TILTING UTTERLY IMPOSSIBLE;
And as there are fewer parts, there is less liability for the Gasholder to get out of order in working.

STABILITY UNDER WIND PRESSURE
of a Gasholder constructed upon this system is at least equal to, and from experiments and calculations made is far in excess of, that of a Holder of the same dimensions guided by the elaborate guide framing at present in use.

The removal of heavy guide carriages and rollers from the top curbs considerably lowers the centre of gravity of the structure, and dispenses with the extra strength of sheeting necessary to carry these at the points where they are attached to the gasholder.

The plan adapts itself to telescoping to any reasonable extent, and enables very shallow holders or lifts to be employed with perfect stability.

FOR FURTHER PARTICULARS AND ESTIMATES, APPLY TO THE ABOVE.

Telegrams:
"Gastoves," Warrington.

TEMPORARY LONDON OFFICES & SHOW-ROOMS: 65 & 66, BASINGHALL STREET, E.C.
Winners Nelson Test, June 2, 1891; Nottingham Medal, Nov. 28, 1891.

GAS COOKING RANGES
Richmond & Co Limited
GAS FIRES
Heating Stoves
WATER HEATERS
BOILING BURNERS
GAS ENGINEERS

WARRINGTON & LONDON.
E. W. T. Richmond, Managing Director. Sole Agents for Webb's Lamps.

Heating-Stoves and Gas-Fires.

BEST VALUE IN THE TRADE. MANY SPECIALITIES.

Best for Hiring-Out. No Sheet-Iron Parts.

SEND FOR LIST.

SEASON 1892. NEW IMPROVEMENTS TO COOKERS. RICHMOND'S PATENT WHITE ENAMELLED STEEL CROWN PLATE NOW ADDED AT LOW PRICE.

No. 30, 2/-. | No. 40 & 50, 2/6. | No. 100, 3/-. | No. 120, 3/6. | No. 140, 4/-. | No. 160, 5/- sub.

ASHMORE, BENSON, PEASE, & CO., LTD.,

STOCKTON-ON-TEES.

TWO-LIFT GASHOLDER, WITH TANK WORKING WITH PEASE'S PATENT WIRE-ROPE SUPPORTS.
(From Photograph.)

TANGYES LIMITED,

CORNWALL WORKS, BIRMINGHAM.

LONDON: 35, Queen Victoria Street, E.C.
GLASGOW: Argyle Street.
JOHANNESBURG Commissioner Street.
NEWCASTLE: St. Nicholas Buildings.
SYDNEY: Hay Street.
GENOA: 9, Via S. Ugo.
MANCHESTER: St. Mary's Gate.
MELBOURNE: Collins Street.
BILBAO: Gran Via 52.

THE TANGYE GAS HAMMER

(ROBSON & PINKNEY'S PATENTS)

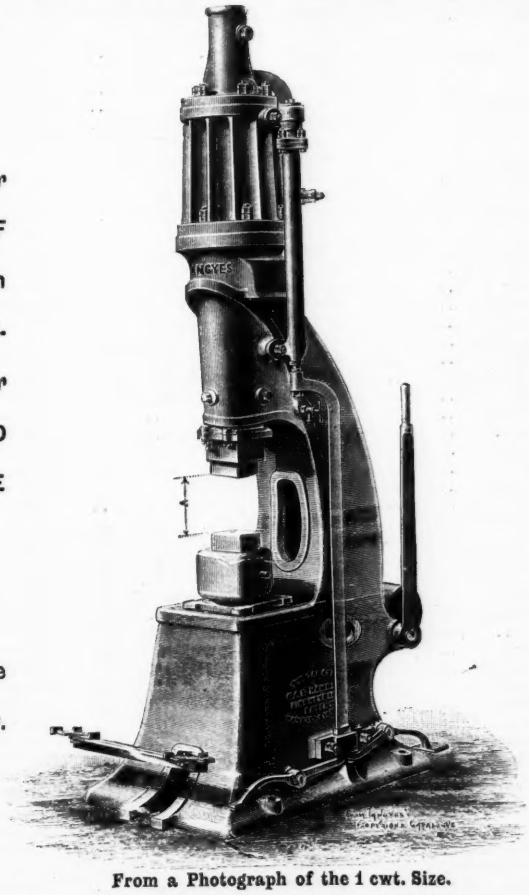
FOR USE IN

GAS-WORKS, SMITHIES, IRON-WORKS, COLLIERIES, &c.

TANGYES LIMITED, SOLE MAKERS.

With the smallest Hammer (¾ cwt. size), over 2500 OF THE HEAVIEST BLOWS can be given for ONE PENNYWORTH OF GAS at 2/6 per 1000 feet, or about 4500 varying blows with the SAME quantity of Gas.

The other sizes in like proportion, see table below.



From a Photograph of the 1 cwt. Size.

The smallest Hammer (¾ cwt. size) strikes a Maximum Blow equal to that which would be given by A WEIGHT OF 3 CWT. FALLING THROUGH A HEIGHT OF ONE FOOT.

This can be repeated at the rate of 120 blows per minute.

This Gas Hammer is now made with Hand Gear, Foot Gear, and loose Anvil Block as shown above, and is supplied in the following sizes:—

Size. Cwt.	Maximum Blow.* Cwt.	Blows per Pennyworth of Gas ** approx. No.	Blows per minute. No.	Maximum Distance A-Ins.	Total Weight approx. Cwt.	Measurements overall. Ins. approx. Height, Length, Width.
¾	3	2500	120	6	26	90 × 54 × 24
1	4½	1900	120	6	27	90 × 54 × 24
2	8	1600	80	9	38	110 × 60 × 27
3	10	1300	70	10	40	110 × 60 × 27

* The maximum blow in each case is equivalent to that of a weight the number of cwts. stated FALLING THROUGH A HEIGHT OF ONE FOOT.
**Based upon the Birmingham price to small consumers—viz., 2/6 per 1000 feet. The numbers given are for MAXIMUM Blows; a much greater number o VARYING blows can be obtained for the same quantity of Gas.

It will be seen from the data given above, that this Hammer may be economically used in competition with a steam hammer even in places where the price of Gas is at its highest. It is ready for work at any moment, day or night, and works as economically for a few minutes as when in sustained operation.

PRICES ON APPLICATION.

Telegrams: "TANGYES BIRMINGHAM."

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KIRKHAM, HULETT, & CHANDLER, LIMITED.

[SIDNEY HERSEY, Managing Director.] [J. CHANDLER, Engineer.]

436 Patent "Standard" Washer-Scrubbers,

Capable of extracting the whole of the Ammonia from 410,680,000 Cubic Feet of Gas per 24 hours.

Erected and in course of construction at present date, amongst them being the following, viz.:—

	Capacity. Cubic feet per day.
Altrincham	600,000
Adelaide	600,000
Aldershot	200,000
Allegheny, U.S.A. ..	1,000,000
Ashton-under-Lyne ..	1,250,000
Amsterdam (2) ..	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co.	200,000
Altoona, U.S.A. ..	350,000
Buxton	250,000
Bradford (3)	1,000,000
,, (3)	1,250,000
,, ...	3,000,000
Bremen	150,000
Baltimore, U.S.A. (3)	1,000,000
Balmain, N.S.W. ..	125,000
Bishops Stortford ..	150,000
Blackpool	400,000
Brussels (3)	1,250,000
,, ...	750,000
Banbury	250,000
Birmingham (2) ..	5,000,000
Birkenhead	2,500,000
Blackburn	1,500,000
Bochum	600,000
Burntisland	250,000
Boston, U.S.A. ..	2,000,000
Brisbane	1,500,000
,, ...	300,000
Burton-on-Trent ..	1,500,000
Barcelona	350,000
Barking	100,000
Baerlien & Co. (2) ..	20,000
Bombay	700,000
Buffalo, U.S.A. ..	550,000
,, ..	500,000
Brooklim, U.S.A. ..	300,000
Bergen	250,000
Berlin	150,000
Bournemouth ..	1,000,000
Bridgeport, U.S.A. ..	500,000
Brunswick	300,000
Beck & Co., St. Louis	100,000
Barmen Rittershausen	600,000
Bexhill	125,000
Brooklyn, U.S.A. (2)	1,000,000
Brunner, Mond, & Co.	400,000
Cheltenham	2,000,000
Cannes	200,000
Croydon	1,500,000
Copenhagen	200,000
Clevedon	200,000
Columbus, U.S.A. ..	500,000
Cincinnati, U.S.A. (2)	1,500,000
Chicago, U.S.A. ..	3,000,000
,, (2) ..	1,000,000
Chemnitz	1,000,000
Crewe	1,250,000
Colonial Gas-Works Co.	100,000
Cadiz	300,000
Charlottenberg ..	600,000
Dudley	750,000
Driffield	100,000
Dukinfield	500,000
Dover	750,000
,, (2)	1,000,000
Deal	200,000
Derby (2)	1,500,000
,, ...	1,000,000
Dublin	3,000,000
Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A. ..	350,000
Denver, ,, ...	500,000
,, ,, ...	1,000,000
Düsseldorf	750,000
,, ...	500,000
Dumfries	250,000
Dunedin, N.Z. ..	400,000
Darlington	1,250,000
Detroit, U.S.A. ..	750,000
Edinburgh	1,500,000
,, ...	2,000,000
Enfield	300,000
Essen	300,000
Elbing	150,000
Falmouth	150,000
Frankfort	300,000
Farnworth	400,000
Fenton	400,000
Friedenshütte ..	500,000
Fürth	400,000
Freiburg	200,000
Goole	250,000
Glossop	300,000
Guildford	300,000
Gloucester	1,250,000
Gera	300,000
Grafton, N.S.W. ..	100,000
Grieg	300,000
Georgetown, U.S.A.	250,000
Gluckauf	200,000
Heywood	600,000
Holywood	125,000
Huy	70,000
Harrow	250,000
Harrogate	250,000
Halstead	150,000
Heilbronn	200,000
Havanna, Cuba ..	750,000
Hastings	1,500,000
Huddersfield	300,000
,, ...	750,000
,, ...	1,500,000
Hof	200,000
Hampton Wick ..	500,000
Heckmondwike ..	500,000
Haverfordwest ..	100,000
Halifax, N.S. ..	350,000
Hamm	200,000
Halle	400,000
Heidelberg	300,000
Hartford, U.S.A. ..	1,000,000
Ilkeston	300,000
Inverness	250,000
Ilkley	200,000
Ilford	100,000
Kingston-on-Hull ..	400,000
Kidderminster ..	750,000
Kidsgrove	100,000
Königsberg	1,000,000
King's Lynn	300,000
LONDON :—	
The Gaslight and Coke Co. :—	
Beckton (6) ..	1,250,000
,, (2) ..	2,500,000
Silvertown ..	1,000,000
LONDON—*Continued.*	
The Gaslight and Coke Co. :—	
Bromley (2) ..	2,000,000
,, (4) ..	1,500,000
Shoreditch ..	2,500,000
Pancras (2) ..	1,500,000
Pimlico	2,000,000
Nine Elms (2) ..	3,000,000
Kensal Green (2)	3,000,000
South Metropolitan Co. :—	
Greenwich ..	3,000,000
Woolwich ..	400,000
Vauxhall (2) ..	3,000,000
Lea Bridge ..	300,000
West Ham	1,500,000
,, ...	3,000,000
Leeds (2)	2,000,000
,, (4)	3,000,000
Leominster	150,000
Leiden	560,000
,, ...	600,000
Liverpool (5)	2,000,000
,, (4)	3,000,000
Lincoln	1,000,000
,, ...	600,000
Lowell, U.S.A. ..	1,000,000
Laclede, ,, ..	1,000,000
Louisville, ,, ..	1,500,000
Long Eaton	500,000
Lille	900,000
,, ...	450,000
,, ...	750,000
,, (2)	250,000
Luckenwalde ..	330,000
Liegwitz	300,000
Lincoln, U.S.A. ..	250,000
Lawrence, ,, ..	500,000
Lynn, ,, ..	300,000
Lyons	1,500,000
Maidstone	1,000,000
Marseilles (2) ..	1,500,000
Mons	500,000
Malines	250,000
Melbourne (5) ..	1,500,000
Manchester (2) ..	2,500,000
,, ...	400,000
Middleton	400,000
Manley, N.S.W. ..	100,000
Minneapolis, U.S.A. ..	750,000
Magdeburg	300,000
Memphis, U.S.A. ..	750,000
Nottingham	1,250,000
,, (2) ..	2,500,000
,, (2) ..	2,000,000
,, ...	1,500,000
Newport, U.S.A. ..	430,000
Newmarket	150,000
Newark, U.S.A. ..	680,000
Northfleet	200,000
New York, U.S.A. ..	2,000,000
Nice	600,000
Newcastle, N.S.W. ..	200,000
Numea, ,, ..	100,000
Namur	250,000
Newark	350,000
Nassau, U.S.A. ..	1,000,000
Oldbury	500,000
Otley	200,000
Oswestry	250,000
Ober Schlesian ..	1,500,000
Otto & Co.'s Coke Works	1,500,000
Plymouth	2,000,000
Parramatta, N.S.W.	100,000
Prescot	150,000
Providence, U.S.A. (2)	750,000
Plauen (2)	300,000
Portsmouth (2) ..	2,500,000
Pittsburg, U.S.A. ..	1,500,000
Portland, ,, ..	560,000
Pawtucket, ,, ..	500,000
Quebec	250,000
Radcliffe	750,000
Rouen	250,000
Ramsgate	1,000,000
Reigate	200,000
Richmond, U.S.A. ..	250,000
Roxbury, ,, ..	500,000
Runcorn Soap Co. ..	20,000
Rockhampton, N.S.W.	125,000
Richmond	1,500,000
Reading	2,000,000
Reichenbach ..	200,000
Smethwick	750,000
Sydney, N.S.W. (2) ..	1,000,000
,, ..	2,500,000
Sunderland	1,500,000
St Joseph's, U.S.A. ..	250,000
Spa	100,000
Sevenoaks	300,000
St. Petersburg ..	2,000,000
,, ..	1,500,000
St. Louis, U.S.A. (2)	2,000,000
,, ..	1,000,000
Silesian Coal Co. ..	600,000
San Francisco, U.S.A. (2)	2,000,000
Sheepbridge Coal Co.	40,000
Stettin	200,000
Singapore	300,000
Sutton	500,000
Tonbridge	150,000
Tipton	400,000
Tottenham	1,000,000
Toledo, U.S.A. ..	750,000
Toronto	1,000,000
Uxbridge	300,000
Valparaiso	500,000
West Bromwich (2) ..	1,000,000
Willenhall	250,000
Weston-super-Mare ..	500,000
Waltham	150,000
Wormwood Scrubs ..	300,000
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Wellington	150,000
Warwick	300,000
Wheeling, U.S.A. ..	500,000
Walker	300,000
Westgate	100,000
Wilmington, U.S.A.	500,000
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Wolverton	100,000
Wellington, N.Z. ..	250,000
Whitchurch	175,000
Washington, U.S.A.	2,000,000
Wallasey	750,000
Weimar	150,000
Wurzen	200,000
Worcester, U.S.A. ..	750,000
Yeadon	500,000
Yeovil	250,000

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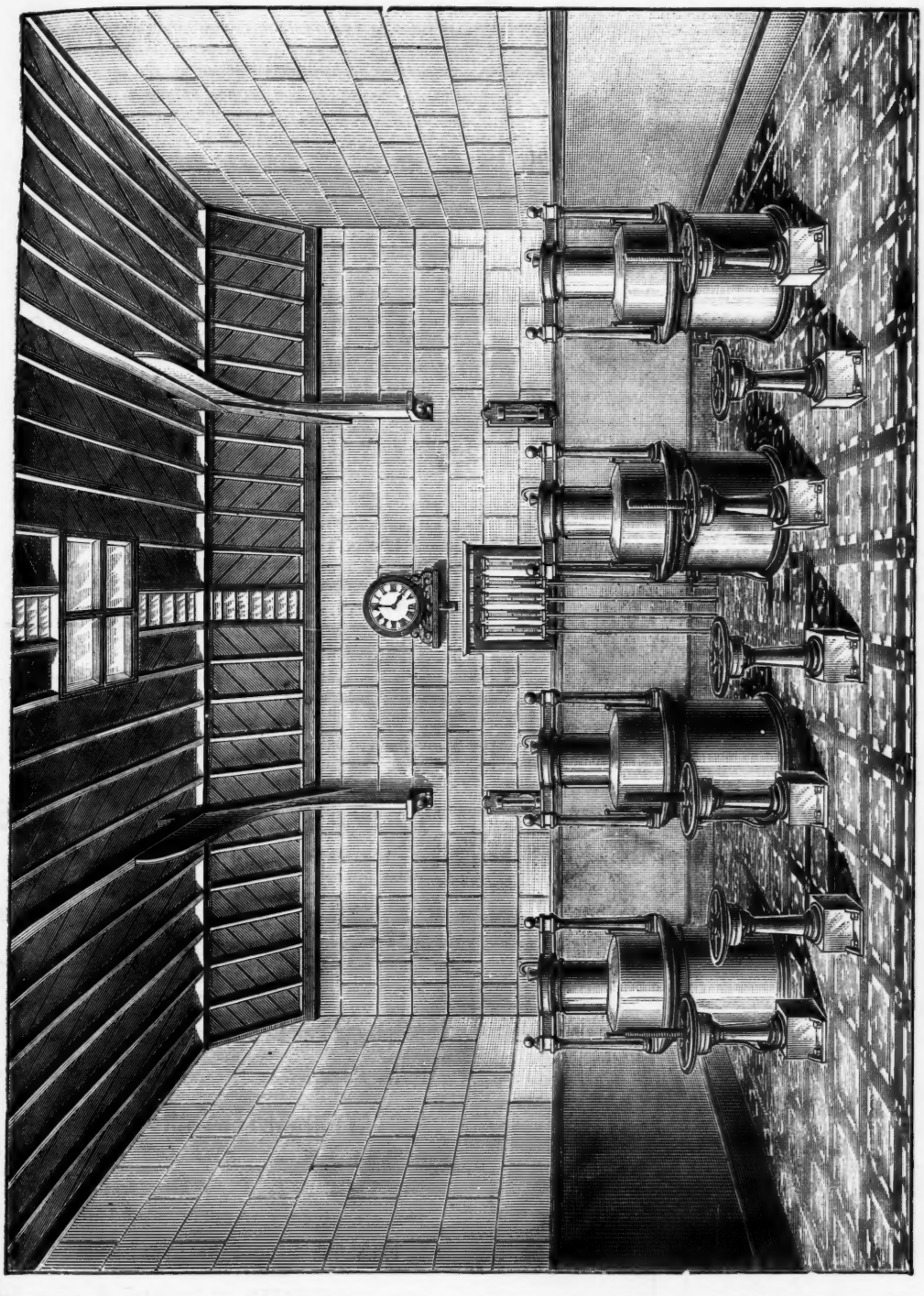

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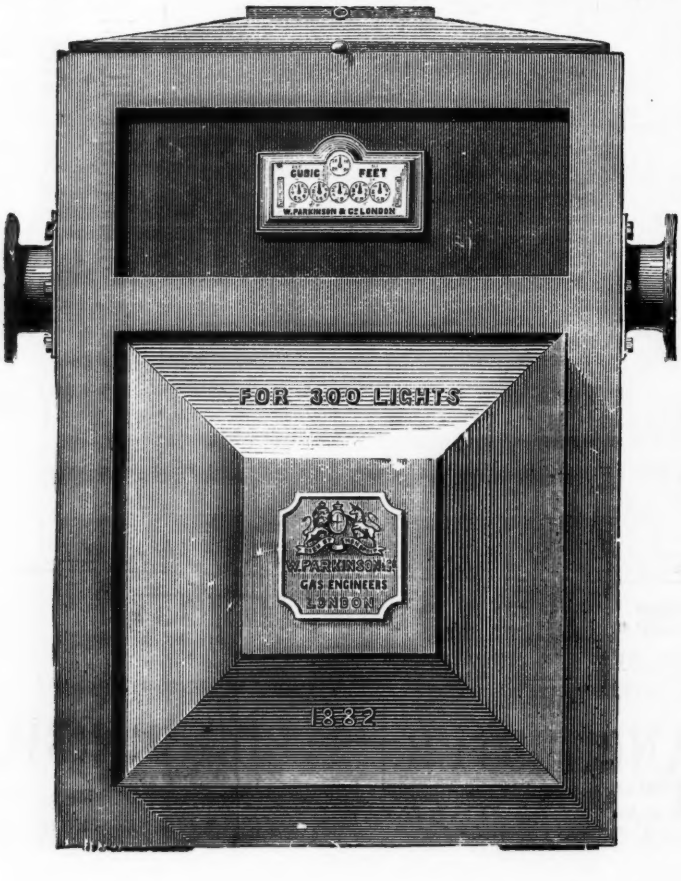

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[See also Advt., p. 372.

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No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 23, 1892.

The South Metropolitan Meeting.

THE meeting of the South Metropolitan Gas Company on Wednesday last was fairly well attended; and the assembly was repaid for the trouble of making a pilgrimage to London Bridge in threatening weather by an interesting speech from the Chairman, Mr. George Livesey. Everybody who knows Mr. Livesey also knows that he is a man of strong views respecting a variety of points of gas-works administration, and that in his case "out of the fulness of "the heart the mouth speaketh." We believe that the South Metropolitan Chairman hardly ever gets on his legs at the general meetings of the Company without having registered an inward vow to "make it short." But the result usually is that his stock of experiences and his vivid perceptions of the hour refuse to be condensed; and so by the time he sits down he discovers that, after all, he has spoken at some considerable length. There are certain topics that rarely fail of being touched upon whenever Mr. Livesey addresses a meeting of gas shareholders; prominent among them being capital expenditure, the sliding scale, and the condition of gas-works labourers. Of course, he dealt with all these, and more, last Wednesday; but, in addition, he had a very pressing matter to discourse upon in the depreciated value of coke. This subject was put in the first part of the Chairman's speech, as it occupied the forefront of the Directors' report. It is Mr. Livesey's opinion, as it unquestionably has all along been ours, that there has been no solid justification for the enormous advance in the price of coal which has afflicted all classes of buyers during the past year or two. That there was less justification for this advance than there was for that of the coal famine years 1873-5 is maintained by Mr. Livesey from the circumstance that this time residuals—coke, tar, &c.—have not participated, as they did then, in the expansion of value of the raw material. To follow the lessons drawn by Mr. Livesey from these facts, it is necessary to piece together the first and the penultimate portions of his address, because in the former he states the case of his Company in regard to the questions of coal and coke values, and in the latter he shows how the sliding scale has modified the position of Gas Companies since 1875. Measured by the drain upon the reserve for the double purpose of avoiding unnecessary increase in the price of gas and keeping up the normal dividends, the strain of the last two years has been more severe than that of 1873-5. But yet in every case the last pinch has been overcome at less cost to the public than the first; and this effect, Mr. Livesey urges, is due to the action of the sliding scale. It is impossible to avoid the reflection that this argument, which really bore more upon the action of The Gaslight and Coke Company than upon the circumstances of the South Metropolitan Company, supplied a better apology for the former than was furnished to Colonel Makins for his address at the recent meeting in the Horseferry Road.

Upon the labour question Mr. Livesey is naturally more prone to talk than ever, since his appointment on the Royal Commission. Here day after day the procession of witnesses from the classes of employers and employed files before him; and he would be more or less than human if he did not apply to the statements he hears in this way the test of his own experience of the workman in peace and war. Mr. Livesey is anxious to make others understand that, so far, the experiment which he has adopted at the South Metropolitan Gas-Works is a great success. It is a matter which he has very greatly at heart; and so he talks about it as freely as all men do concerning the things which are uppermost in their minds. Mr. Livesey is very much more than a man of one idea. His mind responds to many notes; but it vibrates and finds utterance in vivid speech when the chord of Labour is struck in its presence. It is very likely that some of his audience at these meetings fail to share his enthusiasm for essaying to solve this modern riddle of the Sphinx—the question of Labour. Whether there are any such or not, they seem quite content to take their Chairman as they find him; and the South Metropolitan shareholders, as a body, appear both interested and pleased when Mr. Livesey talks to them at large on the topics that so obviously interest himself.

Upon the subject of the libel case of *Higgins v. Ward*, the Chairman was able to give explanations which, if they had appeared sooner, might have prevented the circulation of much silly and malicious rumour. It now appears that the plaintiff in this suit appealed to the South Metropolitan Directors—his employers—for protection against the slanderous aspersions upon his character which Ward, the paid Assistant-Secretary of the Gas Workers' Union, thought fit to vent in public in the supposed interest of Trade Unionism. The necessary protection was given; and the man's vindication and his assailant's discomfiture were complete. It is possibly a matter for congratulation among Trade Unionists and their press supporters that the £200 damages, and costs, given to the plaintiff in this case by the Court, cannot be recovered, since the Trade Union official had nothing to distrain upon. The consequences of the judgment cannot, however, be

other than unpleasant to the individual in question; and they will also serve as a salutary check to other loose-tongued gentry of the same breed, which is a sufficient public gain.

The expenditure of capital upon new works, and the upkeep of meters and stoves, were also dealt with by Mr. Livesey, who, moreover, mentioned the subject of the nominal rate of dividend, and the real return to investors in the Company's stocks. This last was the principal topic discussed from the body of the hall; one proprietor asking whether it would not be possible to adopt some such scheme of unification of capital, upon the basis of a dividend more nearly expressing the return to investors who have bought their stock at a premium, as those which have recently been suggested. In his reply, the Chairman gave it to be understood that the matter had not been overlooked by the Board; but he disclosed cogent reasons why no such projects should be meddled with by those responsible for the safety of the Company's capital.

The Consequences of the Coal Porters' Strike.

It has been stated that there was more than met the eye in the recent strike of London coal porters at the behest of their Union officials; and that if these wire-pullers had been able to maintain their position, a general revival of the "strike policy" would have taken place all over the country. When it was discovered that, although willing enough to turn out by order, the coalies were disposed to think for themselves with regard to the justification for, or the policy of the movement, the order to return to work was given to prevent the appearance of a complete breakdown of the Union organization, which would have occurred at the end of the week or the beginning of the next, when the men intended to go in with or without official permission. Our suggestion of last week, that the apparent reluctance of the East-end coalies to resume their employment was really due to a desire on their part to keep "Saint Monday" before turning in again, was borne out by the facts; for on Tuesday there was a general falling-to upon the old terms. It is not pretended, even by the Union Press, which claimed the result of the strike as a victory for the men, that the conditions of their employment have been altered in the slightest degree whatever. The notice issued by the employers' Society was not withdrawn or modified in any way, and so the members of this organization retain their asserted liberty to employ any man they please, irrespective of whether or not he belongs to a Union; and they have successfully defended themselves from falling under the fate, with which they were threatened, of being made agents for enforcing the payment of Union subscriptions. Fresh evidence has transpired in the meanwhile to prove that the central station Electric Lighting Companies of the Metropolis were caught, when the strike began, in a far less favourable condition for keeping up their supplies of current for a week of no coal deliveries than are the Gas Companies when subjected to a week of thick fog. It has even been reported that the manager of one electric light works was driven to appeal for help to the superintendent of one of the London gas-manufacturing stations, and begged for the promise of a few tons of coal out of store if the strike should last over the end of the week. The gas engineer, it is said, did not commit himself to any engagements of this nature; but, having an eye to business, he sent the applicant some loads of coke, with advice to try whether this fuel would serve the turn.

It is notorious that the fundamental principle of the New Trade Unionism is the aphorism that what is sauce for the goose is *not* sauce for the gander. Thus, while it is the depth of iniquity for an employer of labour to refuse to employ unionists as such, it is held, by those to whom Tom Mann and Co. are the prophets of a new dispensation, that it is the height of virtue for unionists to refuse (when they dare) to work with freemen. This principle has never been more crudely exhibited than it is in last week's number of the *Trade Unionist*, where in the same column the coalies' strike is glorified as a brilliantly successful operation "to resist the open and formal estab-"lishment of a systematic black-list," and the action of the conductors of the paper in "black-listing" two County Council candidates is maintained as proper and reasonable. There is plenty of "moral" in this little bit of inconsistency, for those who take the trouble to pick it out.

The Chartered Rating Appeal—A Disputed Point.

Those of our readers who have followed the great assessment appeal of The Gaslight and Coke Company, and may have expected, according to promise, that the whole affair would have been finished last Friday, must possess their souls in patience for yet another week. On the day named, the matter was "mentioned" in Court; but the point raised, although of grave importance, was purely a preliminary one to the final apportionment, the settlement of which has been again postponed until next Friday. It has transpired that the parties take diametrically opposite views of the meaning of the Court with reference to the valuation of the "landlord's share," which is fixed, by the terms of the judgment, at the sum of £620,500. The words of the judgment are: "We find the landlord's "share, *subject to deduction for rates*, to be £620,500." The following sentences go on to explain how this amount is to be treated. It now appears that the appellants wish to construe the phrase in italics as meaning that the whole amount of rates payable is to be deducted from the sum stated; but the respondents hold that it only means that this sum is to be corrected by the difference between the rating now to be fixed and that which prevailed in the account year, which constitutes the datum for all calculations by both parties. This view has been sanctioned by a so-called "Explanatory Note," handed down by the Chairman, the text of which will be found in another column. Meanwhile, however, the appellants have had time to appreciate the difference which the two readings of the Chairman's phraseology would mean to them (it is said that this difference would be upwards of £30,000 a year); and accordingly they appeared in force before the Court on Friday, with the object of getting their view of the point adopted by the Chairman. The plot was soon disclosed by the appellants' leading Counsel, Mr. Littler, Q.C., who proceeded to characterize the "Explanatory Note" already referred to as a "substituted judgment"—a statement which on the instant aroused the Court into strong antagonism. After nearly an hour's talk, in which the appellants' view was advanced by their Counsel in every shade of argument, from meek pleading by Mr. Castle, to the minatory bluster of Mr. Danckwerts, Sir Peter Edlin was left maintaining his right to explain his own judgment in his own way; and the net result of the day was to add some more heavy figures to the tremendous costs incurred. This has indeed been one of the most remarkable assessment cases on record, whether it is judged from the complexity of the proceedings or the amount of money involved. We hope to be able to state next week exactly how much both sides have gained or lost by the appeal; but meanwhile it may be remarked that the opinion is held by many that the Company will have little cause for satisfaction with the way in which matters have gone.

The Board of Trade Report upon Private Bills and Orders.

The Board of Trade have issued their customary report upon the proposed Private Bills and Provisional Orders of the session, as noticed in another column. The nature of these projects for legislation, so far as gas and water supply is concerned, has already been explained in the Journal. From this report it appears that there are 19 Bills relating, either wholly or in part, to the supply of gas—all English. There is not a single Scotch or Irish Gas Bill in Parliament this year; so that if any scheme for the devolution of Private Bill Legislation to local Commissioners of Parliament representing either of the sister kingdoms is carried into effect this session, as threatened, it will not affect the Westminster practitioners in this particular line of business. Taking the whole class of Gas, Electric Lighting, and Water Bills together—43 in number—it is reported that the total capital proposed to be raised under these schemes amounts to £9,447,900, or no less than £7,026,572 more than in 1891. The particulars of all the proposed measures are neatly tabulated in the usual way in the report. The manner in which the Bills are grouped is stated; but nothing is specially mentioned with regard to new clauses. Some of the Gas Bills do contain a few novelties, however, as will have been already seen by our abstracts; and the dealings of Parliament with these may prove interesting, so far as they go. The most remarkable feature of the whole class of Bills is not in the gas, but in the water schemes; and it is Wales which is to be most affected by this year's Private Bill business.

The Dealing in Chartered Residuals.

It looks as if the questions of fact and of policy opened up at the recent meeting of The Gaslight and Coke Company are to grow more serious the longer they lie open to the public gaze. Referring to the subject of the dealings of the Company in residuals, which was raised by Sir F. Mappin, and temporarily disposed of by an adroit repartee of the Governor, Colonel Makins, we have now to state that a correspondent has drawn our attention to the evidence in the case of *Stockman v. Dasnières*, which was reported in our "Legal Intelligence" in the issue for May 13, 1890. This was an action arising out of a transaction in pitch. It is unnecessary to repeat the story as laid before Mr. Justice Day and a special jury; but the point of it which bears upon the Chartered system of disposing of residuals consists in the statement made in evidence that "the plaintiff bought for himself, in a rising "market, 1000 tons [of pitch] from Mr. W. G. Blagden, "the agent for The Gaslight and Coke Company (who has "the larger proportion of the pitch for sale on the London "market); *resold the stuff to Mr. Blagden* on the 13th of "that month at a profit of £56 5s.; and on the same day "bought again for Mr. Dasnières, at a further advance "in price of 1½d. a ton." Now, be it observed that we offer no comment whatever upon this evidence, in so far as it affects Mr. Blagden personally or as a business man. The report is strictly *bonâ fide;* and its accuracy has never been called in question. The matter comes before us again, however, in the new form of an illustration of the gravamen of Sir F. Mappin's interpellation of the Chartered Board. The point of the reference is contained in the words which we have italicized; and the whole question is as to how this record is to be reconciled with Colonel Makins's statement of the 5th inst., that the agent of The Gaslight and Coke Company for the sale of residuals "never buys an ounce or a ton for himself." Believing, as we are justified in doing from this report, that Mr. Blagden on at least one occasion did buy a residual for himself, the query as to whether he was or was not permitted to do so by the terms of his appointment under the Chartered Board is, in the first place, a matter for the parties to this arrangement. There is nothing culpable in buying or selling pitch in the ordinary way of trade; and the Chartered Board are within their right in making any agreement they think good in the interest of the Company for the disposal of their residuals through an agent who may be in the trade. It is also competent for a shareholder to address an inquiry to the Board upon the subject; and we suppose it will not be gainsaid that, when such an inquiry has been publicly made, it is reasonable to expect a trustworthy answer to it. The situation now created is exceedingly awkward, and requires to be cleared up with the least possible loss of time. We are called upon to mention the matter for the sake of correcting a public statement of the Governor of the Company, which appears to be, on the face of it, misleading; just as was his citation of Cambridge as a town where the price of gas had been advanced by 10d. per 1000 cubic feet, which we were called upon to put right last week. Moreover, it does not rest with us to give or withhold publicity in regard to this affair. The whole report of the case cited has been reprinted from our columns, not by us, and is apparently being circulated widely among persons presumably interested in the class of transactions referred to; and our readers will await with pardonable curiosity the explanations which the Chartered Administration, or the other parties concerned, may have to offer of the circumstances as they stand.

Death of Mr. W. H. Michael, Q.C.—We regret to record the sudden death, on the 15th inst., at Schloss Labers, Meran, Tyrol, of Mr. W. H. Michael, Q.C., the well-known Parliamentary Counsel, and joint author, with Mr. Shiress Will, of the standard work on "The Law of Gas and Water Supply" with which their names are associated. Deceased was in his 71st year.

Presentation to Mr. J. B. Fenwick.—Last Thursday, Mr. J. B. Fenwick, Manager of the Windermere Gas and Water Works, was presented with a testimonial by his friends in that town, on the occasion of his leaving to take the position of Manager of the Retford Gas and Water Works, to which, as announced in the JOURNAL a few weeks ago, he has lately been appointed. The testimonial consisted of electro-plated adjuncts to the dinner-table and a choice set of table cutlery, accompanied by a scroll bearing an inscription commemorative of the event. The gift was suitably acknowledged by Mr. Fenwick.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 336.)

The past week was a very dull one for the Stock Exchange, and business was flat, stale, and decidedly unprofitable. It is hard to find a single redeeming feature about the entire period. The Continental Bourses were much depressed, and nothing at home showed a ray of brightness. Even American rails gave way; while as for home rails, nothing cheerful could be looked for in a week of blizzards and snow-blocks. *A propos* of rails, an interesting feature was the renewed attempt, adroitly engineered by the Stock Exchange, made at the North-Western meeting on Friday, to force the obnoxious Forged Transfers Act down the throats of the Board. Our views concerning this "Act for the Encouragement of Forgery, and for enabling stockbrokers to pocket their commissions without having earned them," have been fully expressed before; and we find nothing in the latest arguments advanced in support of it, to change our opinion as to the utterly wrong principle upon which it is founded. The manner in which Lord Stalbridge dealt with this attempt was excellent; and he is evidently determined not to allow his Board to be coerced by interested agitators. The Money Market is in a better condition, and rates are hardening. The Gas Market has not shown much activity, and there is but little change to note in values. Movements have not been uniform, but rather in accord with the special circumstances of each issue; though there does appear to be a more general disposition to invest in the preferentially secured stocks. Gaslight "A" opened firm, and was steadily though moderately dealt in at about 217½ every day until Friday, when a parcel was done "specially" at 216; and the quotation was knocked down 1. The debenture stocks were in demand; and the 6 per cent. issue rose 3. The preferences and the limited were fairly active, and sellers of "H" raised their price one point. South Metropolitans were much more brisk and very firm; the "B" especially realizing good figures, though the quotation was only put up 1. Commercials were quiet, and they look firm. Suburbans and Provincials were unchanged. The Tottenham and Edmonton Company appear to have had a good half year; having earned their 11½ per cent. dividend within a pound or two. Of the Continentals, European was firm; but Union was not quite so strong, and Imperial suffered a fall of 1½. Among the rest, the only changes were in South Americans; Buenos Ayres and San Paulo receding ½ each. The Water Companies are about as they were; the only variation being a relapse of 1 in Grand Junction.

The daily operations were: Gas opened well on Monday, but did not attain any degree of activity. Advances were made of 1 each in South Metropolitan "B," and Gaslight 6 per cent. debenture; and ½ in ditto "H." Tuesday's business was mostly in Gaslights and South Metropolitan "B," which were firm; but Imperial Continental fell 1½. Prices continued equally good in the Gas Market on Wednesday; but Grand Junction Water receded 1. On Thursday, business was about the same; and the general tendency to firmness was maintained. Friday was much quieter, and a fall of 1 in Gaslight "A" and ½ in Buenos Ayres took place. Gaslight 6 per cent. debentures, however, advanced 2. Business on Saturday was very limited; but prices had a healthy tendency generally, though San Paulo lost ½.

RICHARDS AND PAYNE ON THE METROPOLITAN WATER SUPPLY.*

To write upon the subject of the Metropolitan Water Supply, and yet "to abstain from taking any side in the present controversy," would seem to be a somewhat difficult and self-denying task. It has, however, been fairly well performed by the two barristers, learned in the law, who are the authors of this book; the feat being accomplished mainly by adhering as closely as possible to the historical and legal elements of the question. We have thus a digest and a compilation; giving a bird's eye view of a very wide field. The book is dedicated, by permission, to Sir John Lubbock, as Chairman of the London County Council. In this there is nothing incongruous; for, although Sir John has expressed an opinion that the Companies were the best custodians of the water supply, he is in no sense a partizan. The dedication, in fact, simply implies the absence of any intention to attack the Water Companies. In the history of this subject, it is interesting to note that the Commission of 1851, consisting of Mr. Graham, Mr. Miller, and Mr. Hofmann, reported in favour of the existing supply on several points; one being that putrefactive decomposition takes place less rapidly in hard than in soft water. It was further declared that "the advantages of the present sources are enhanced by the enormous quantity of water they are capable of supplying." Disadvantages were enumerated, due to flood waters and the presence of sewage. These are matters which, of course, have been dealt with very differently since that date. Concerning the inconvenience of using hard water for domestic purposes, the

*"The Metropolitan Water Supply." By H. C. Richards and W. H. C Payne, Barristers-at-Law. London: Argus Printing Company, Limited.

Commissioners remarked that the hardness of the London water was of the least objectionable kind; being of a temporary character, capable of being diminished to a considerable extent by boiling. With regard to the result of giving a supply of soft water to the Metropolis, it was objected that the "anti-putrescent" quality of the hard supply would be lost, and the water rendered less fit for the few days' storeage which must always be had in reserve to meet the casualties of city distribution. A greater discoloration of the water resulting from oxidation of the iron pipes was also to be apprehended than that which was observed with the existing hard and alkaline supply. If the evidence of Mr. Homersham was to be relied upon, there was little fear of a want of water. This Engineer calculated that the area of land sloping towards Watford, consisting for the most part of chalk hills, embraced more than 1200 square miles, and was capable of yielding 408 million gallons daily if required. This estimate may be excessive; but it was independent of whatever might be obtained from the chalk beds to the south-east of London. The Commissioners concluded their report by an emphatic recommendation of the chalk spring water, both in respect to its quality, and the fact that the sources were near at hand. They contended that, "with such a noble application of the chalk spring water in view as the supply of the Metropolis, it would be a desecration to permit that water to be wasted on other uses, and most impolitic to allow the possession of it to pass into private hands."

It is a question whether we have not to go back to the Commission of 1851, known as the Chemical Commission, for the best and truest light on the Metropolitan Water Question, so far as the physical facts are concerned. The Royal Commission of 1867, under the presidency of the Duke of Richmond, presented an admirable report in 1869, but scarcely advanced the subject any further, except to show that the river and well supply combined was adequate and satisfactory, or could be made so. The Rivers Pollution Commission, which followed later on, reported in favour of the spring and deep-well water in the same manner as the Chemical Commission of 1851. The Rivers Pollution Commissioners were satisfied that an abundant supply could thus be obtained, and of the purest quality. Without admitting that the absolute surrender of the river supply would be wise, or is at all needful, we wish to draw attention to the circumstance that eminent authorities who have desired to see the river supply abandoned, have not felt it necessary to advise recourse to a source of supply outside the Thames and Lea watersheds. If we wish to see schemes of this nature advocated, we must go to the reports of the London County Council; the assumption being made that the quality of the present supply is seriously defective, and that the quantity will soon prove inadequate. In respect to quality, the water supply has undergone material improvement in recent years; and as for quantity, there is evidence enough in the work before us to show that there is no ground for apprehension.

The more recent events connected with the London Water Supply are included in the book—coming down to November last, when the Court of Common Council resolved to give the requisite Parliamentary Notices for the introduction of the London Water Bill agreed upon between the Corporation and the County Council. So much for history. There are sundry chapters on law, concerning which we are told: "It is no easy task to unravel the Acts of Parliament which, bound together, constitute the law which regulates the relationship between the Water Companies and the State." Some reflections are cast upon the Companies with reference to this state of things; it being made to appear that the "learned and powerful counsel" employed by them have been too clever for the Select Committees of Parliament. This part of the book, indeed, shows a little departure from the neutral tone generally adopted. Something might have been said as to the way in which Parliament has damaged the Companies, by substituting rateable for annual value as the basis of charge for the supply. A very considerable sum has thus been lost to the Companies, in direct contravention of an established right.

We may presume that the authors of this useful compendium had in view the probability of a serious struggle in Parliament during the coming session, on the subject of the Metropolitan Water Supply. The projected Royal Commission—down to which date the book does not proceed—disposes of any such idea. A couple of years will probably elapse before we get into the thick of the fight; and by that time Messrs. Richards and Payne will perhaps issue a fresh edition of their work, giving the latest particulars. In the meantime, the book will be of service to all who wish to know something as to the history and position of the London Water Companies.

The Vacancy in the Board of the Brighton and Hove Gas Company.—There has been a very persistent rumour of late as to he probable successor to the late Mr. Fuller on the Board of the Brighton and Hove General Gas Company. Influenced doubtless by what has recently appeared in our columns on the subject of the "mutual help" association of certain combinations of directors, auditors, &c., the report of the Brighton Company, after alluding to Mr. Fuller's death, states that "in accordance with the provisions of the Company's Act of 1881, the vacancy at the Board will not be filled up."

ELECTRIC LIGHTING MEMORANDA.

Mr. W. H. Preece on the Cost of Electric Lighting—The Cost of Incandescent Lamp Renewals—Electric Lighting at Bradford and Newcastle.

In the course of the very plausible statement respecting the question of electric lighting which Mr. W. H. Preece was permitted to lay before the readers of the *Daily Graphic*, he not only asserted generally that the electric light is actually capable of competing with gas upon an equality as regards cost, but he ventured upon an ingenious explanation of the reason why consumers of electricity find in practice their lighting bills increased. It is that users of electric lamps will not be content with the same quantity of light that they had been satisfied with from gas; and so, as they insist upon having more lamps, the cost is increased accordingly! This is an audacious statement; but it is tolerably well known how the truth stands. Mr. Preece, and those who side with him in his forlorn attempts to make users of electric lamps doubt the evidence of their pockets, have to make use of a series of assumptions, which they industriously trot out time after time with a touching reliance upon the boundless credulity of the British public that recalls the manner of the late lamented Dr. Kenealy. These assumptions are—first, that every gas-burner in domestic use burns after the rate of 5 cubic feet per hour; second, that these gas-burners never give more than 10 candles illuminating power; third, that a nominal 8-candle incandescent electric lamp affords quite as much light as the foregoing. When the much-enduring subscriber to a central station electric lighting company discovers that, whatever the nominal candle powers involved, he needs, for reading or working, at least twice as many incandescent electric lamps as he used to have gas-burners, Mr. Preece humorously says that it is because he likes more light. It is not in his "brief" to admit that, lamp for lamp, gas is at least twice as effective as electricity; but we have a perfect right to prefer this interpretation of the admitted facts.

The interesting question of the durability of incandescent lamps, which so potently affects the cost of the light to the consumer, is being investigated again, this time in France. So long as the manufacture of these goods is a monopoly in England, it will be vain to expect any definite information on the subject from English sources. It appears, however, that at the laboratory of the Compagnie Popp, of Paris, a series of experiments is in progress which have for their object the determination of the variation in illuminating power of an incandescent lamp during its life, of its mean efficiency for power consumed, and its average durability. These experiments began last March, and are not yet finished; but, in the meantime, an account of some of the results obtained has been published by the author (M. Dujon) in *La Lumière Electrique*. Three makes of lamps have been taken for the purpose of the experiments; and already M. Dujon claims to have deduced for each certain constants which, when inserted in the proper formulæ, give the average fall in illuminating power with use and the durability of the lamp at a stated voltage. M. Dujon appears to have found that there was not much difference between the initial efficiencies of the different lamps tested, and that in most cases the final efficiency lay between 4·5 and 5 watts per candle power—thus confirming English and American rules. The suitability of any make or description of lamp for use in every case must be determined by the costs of current and of renewals. In London, for example, current is charged for at most at 8d. per unit, and lamps cost 45d. each; while in Paris the charges are 1 fr. per unit for current and 2·50 frs. for a lamp. Hence it is more economical to press the lamp hard in Paris than it is in London. Commenting upon these statements, the *Electrical Review* remarks that an English Edison-Swan lamp, starting at about 10-candle power, will burn for 900 hours at a mean illuminating power of 78·8 per cent. of the initial; and that the cost of maintenance, at London prices, would be after the rate of 0·039d. per candle power per hour. In concluding his paper, M. Dujon says that, in his opinion, no appreciable improvement in carbon filament lamps is to be expected; and he suggests that refractory metallic oxides may be tried with advantage in the construction of vacuum lamps.

Bradford and Newcastle-upon-Tyne are foremost among the English towns that have been provided with central station electric lighting undertakings—the one by the enterprise of the Local Authority, the other by that of a local Company. Some accounts relating to the working of both ventures have lately been published; and while we take these for what they may be worth, we do not accept them in either case as fully setting forth the circumstances. It must be obvious that until a few such plants have been worn out, or have broken down, it is impossible to determine the fair rates of depreciation or of upkeep allowable in their case; and this is as much as to say that the accounts can be made to show anything that the exigencies of the management may require. Speaking for the Bradford installation, Mr. Alderman Priestman claimed a profit of £971 upon the working for the past half year, which is a wonderful burst of prosperity, seeing that the previous six months showed a loss of £30. There seems to be some mystery about these accounts, for Mr. Alderman Priestman confesses his inability to state the coal consumption per horse power of the machinery at the station. It appears, however, that somewhere about 865 tons of coal were burnt during the half year to generate

the 154,431 units of electricity sold; so that, as the coal only came to 7s. 7d. per ton delivered, or £342 for the whole, its cost per unit must have been 0·53d. In our news report published last week, which was also reproduced by the electrical journals, Mr. Alderman Priestman was made to say that the coal cost 12·58d. per unit. This is one of the great advantages of a free press—that a reporter may make a public man talk nonsense. Seeing that in Bradford the charge for electricity is 6d. per unit, it would be interesting to know how the ingenious reporter for the local newspaper could reconcile in his own mind this exaggerated cost of coal with the asserted profitable working of the municipal undertaking. At Newcastle, no such precise statistics transpire; but the Company pay a 5 per cent. dividend. This is quite as good as can be reasonably expected. The Directors do not now entertain any wild hopes of superseding the use of gas on Tyneside, if they ever did cherish such a dream; and they seem to be perfectly content to take a comparatively insignificant place beside the Newcastle Gas Company. It is quite according to the modern style, however, for the Chairman of the electrical concern which earns £4800 a year, as against the Gas Company's £220,000, to affect to patronize the latter, and to pretend to "represent the leading energy of this age." It will never do, of course, to "be small and look small." Words are cheap even though electricity be dear; and it would be churlish indeed to grudge the electricians the comfort of that prophet's mantle in which they are so fond of wrapping themselves. It is with no envious feelings that we survey the progress of the Newcastle and District Electric Lighting Company, which seems to be doing good work in its degree. There is doubtless room for a good deal more of the same kind of work in Newcastle; and there is not the remotest probability that anything the electricians can do will hurt the Gas Company.

The Use of Gas in Lighthouses.—At the Institution of Civil Engineers this evening, Mr. D. C. Salmond, Assoc. M. Inst. C. E., will read a paper on "The Illumination by Gas of the Tory Island Lighthouse," on the north-west coast of Ireland.

Commercial Gas Company.—Subject to audit of the accounts, the Directors of the Commercial Gas Company will recommend dividends at the rate of 13 per cent. upon the old stock, and 10 per cent. upon the new, for the half year ended Dec. 31 last.

Increasing Use of Gas for Industrial Purposes.—As an example of the growing use of gas in industrial operations, a customer of Messrs. Fletcher, Russell, and Co., Limited, recently applied to them for an estimate of the cost of a number of Bunsen burners ranged on an iron tube 6 feet long, and calculated to consume about 380 cubic feet of gas per hour. In his letter, the customer stated that he had called upon eleven users of gas for commercial purposes, and obtained orders from them on the understanding that he would give them the necessary instructions for use. These parties had already, he said, ordered goods which would require something like 1300 cubic feet of gas per hour. These incidents show clearly that the supply of gas for workshop purposes will for some time to come tax the producing power of gas companies.

Manchester District Institution of Gas Engineers.—The Honorary Secretary of this Institution (Mr. S. S. Mellor, of Northwich) has notified to the members that the twenty-second annual meeting will be held at the Grand Hotel, Manchester, next Saturday. The retiring President (Mr. T. O. Paterson, Assoc. M. Inst. C. E., of Birkenhead) will open the proceedings, and occupy the chair during the transaction of the introductory business, consisting of the election of Mr. H. Simmonds, of Colne, as a member, and of the Vice-Presidents and officers for the current year. He will then introduce his successor, Mr. Chas. Armitage, of Lancaster, who will deliver his Inaugural Address. Mr. T. Newbigging will afterwards read his paper on "Management," prepared for the November meeting. At the close of the business the members will take tea together.

The Siemens Electrical Laboratory at King's College.—Last Friday, Sir W. Thomson, President of the Royal Society, formally opened the laboratory of electrical engineering which has been founded in King's College, London, by Lady Siemens, in memory of her husband, Sir William Siemens, and as a record of his discoveries in electrical science. The cost of the laboratory has been entirely defrayed by Lady Siemens, who has also placed at the disposal of the Council of the College a sum of money which will be ample to maintain it in proper efficiency. It is to be called the "Sir William Siemens Laboratory." It contains a steam-engine and boiler, direct and alternate current dynamos of latest design, and a full equipment of instruments of the newest construction. Students are admitted to special courses of lectures and laboratory work after having passed two preliminary years in the Engineering Department of the College, or on producing certificates of proficiency in physics, chemistry, and mathematics. The laboratory is under the charge of Professor John Hopkinson. In making the presentation on behalf of Lady Siemens, Sir. W. Thomson remarked that, as a member of the Council of King's College, it was with sincere pleasure and satisfaction that he saw the completion of the laboratory. Lady Siemens earnestly hoped that the desire which prompted her to take this form of memorial to her husband would prove of help in carrying out the advancement of the special branch of science which was so full of interest to him.

THE CRYSTAL PALACE ELECTRICAL EXHIBITION.

THIRD NOTICE.

If the electric light fittings now exhibited at the Crystal Palace leave a good deal to be desired in respect of meritorious design and original application, they are shown in sufficient bulk to impress beholders with the idea that there must be a good deal of business done in this class of goods. It appears, moreover, to be a trade that is centred in London. This is a point worth noticing. The usual advantages of cheaper labour, fuel, and rent, which still operate to enable provincial and country manufacturers of gas-fittings and furnishing hardware, do not seem to govern the nascent trade in fittings for incandescent electric lighting; and even firms originating in Birmingham, like Evered's, who have gone largely into this class of work, are careful to proclaim the fact that it is all produced in Drury Lane. Is this revival of the London production of the best class of metal work due to the circumstance that the renascence of the so-called "hammered iron" goods, which are so largely employed in electric light fittings, occurred in London?

We have mentioned hammered iron; and it is really astonishing how popular this kind of smith's work has recently become. The public seem to neglect electro-plate for it; and even wrought copper and brasswork, including *repoussé* ware, takes an inferior place in comparison with it. Again, in hammered iron goods, the ribbon work, which is not strictly speaking hammered at all, is not so well liked as the rod work, a great deal of which is wonderfully fine. In executive skill the modern smiths certainly equal, if they do not surpass, their mediæval precursors; but in originality they cannot compete. The factory system leads to the wearisome multiplication of the same patterns, while it cheapens the goods; and the result is that the purchaser of a "thing of beauty" turned out under the modern system can never be certain that he will not see the same object in the house of every one of his friends, which is most annoying.

Imitations of candles apart, it is abundantly evident, from what may be seen at the Palace, that the new sort of lamps have not inspired anybody with acceptable new ideas in lighting. Yet there has been a great deal of painful striving after originality, most of which has, however, failed to attain even to the level of the grotesque. The plain, unadorned incandescent lamp is not lovely; and when employed in all its native crudity it is strongly suggestive of ship lighting to anyone who has ever made a trip in a modern steamboat, where it appears at its very best. The difficulty in the artistic employment of the incandescent lamp is essentially the same as that which has baffled modern decorators in the case of gas-burners—its brilliancy as compared with old-fashioned lamps and candles. We want the light it affords, and do not want to look at the light-source itself. The more powerful the light, the less occasion does it give for the trifling fripperies of fitting-out that belong to small lights, such as candles. Despairing of success in disposing of such brilliant light-sources as the incandescent lamp, the first thing the "artistic" decorator does with it is to bury it in semi-opaque glass, or cover it with a heavy shade—of course, at enormous cost in illuminating power. The only alternative is to make the light still more dazzling by setting it in the focus of a brilliantly reflecting mirror, made in the shape of a frond of fan-palm, an arrum-sheath, or some such natural form. This is undoubtedly the most theoretically economical way of arranging an incandescent lamp pendant or bracket; and there are many examples of it, excellently well made, at various stalls in the Palace. But these reflectors throw shadows, which require to be corrected by other lights; and so the theoretical economy is not realized in practice.

At some stalls the observer will be tempted to inquire where are the incandescent lamps—these being so hidden under pretty silken and laced shades. On the whole, we are inclined to regard these as the most successful examples of their kind. There is no reason why the nature of the light should always be proclaimed by the display of the lamp itself, with its irradiating filament. Indeed, there is every reason, on the score of protection for the eyesight, why this should be kept out of the direct vision. It is both convenient and desirable, however, that the character of the system of lighting should be manifested, although not obtruded, by the appearance of the fitting. Thus the incandescent electric light does not require a localized store of combustible material, like the solid candle or the fluid oil, which in turn demands a vase to contain it in close proximity to the light. Neither does it need a pipe connection, as gas does. But it obtains all the necessary supply of electricity through a pair of small wires; and it has no great weight of its own. When these considerations are intelligently expressed, the result at any rate does not give offence, even when it does not yield positive pleasure. We opine that that has the rudiment of a good incandescent electric light fitting which quietly, but unmistakeably, acquaints the observer at the first glance that it is not a candle, to need renewal at short intervals; nor an oil-lamp, to need trimming; nor gas, dependent upon a rigid pipe connection; but is something *sui generis*, which is to be taken exactly for what it is, whatever the ultimate result may be. Surely this ought to be sufficient recommendation. If incandescent

electric lighting is all its partizans claim for it, is it not enough that it does not exist by consuming oxygen locally, and does not possess flame; and why should it ape any other system of artificial lighting?

Circumstances, however, are too strong for the decorators; so that, whether or not they wilfully imitate, in the shape of their lamps, other means of lighting, most electric light fittings do, as a matter of fact, repeat the uses of other systems of lighting. Thus we see many electric table and standard floor lamps, shaded, which might be oil lamps of the ordinary kind for all that can be seen. In these examples, the necessary connecting-wires are distinctly objectionable, as they straggle across the table and over the carpet to the nearest wall-plug. The suggestions of entanglement and consequent upsetting inherent in this method of connection are most disturbing. Imagine having to warn everybody in the room to take heed to their steps whenever they have occasion to approach the standard lamp; and what sport a toy dog would have with the cotton-covered wire! Incandescent lamp pendants have already been mentioned; and as to brackets, it is enough to say that they very often remind one of gas-brackets. When the decorators attempt the quaint and ornamental, they are never successful. Messrs. J. E. H. Gordon and Co., for instance, make a specialty of the employment of a well-known kind of sea-shell as screen reflectors for incandescent lamps; the shell being placed *in front* of the lamp, which is supported on a stumpy bracket. An example is shown of a boudoir in white enamel paint, with these shell screens equally spaced along a high dado, or low frieze. The effect is not happy; and the same may be said of attempts to use these shells in connection with conservatory lighting. It is not merely that the aspect of an interiorly-lighted sea-shell is *bizarre;* the whole thing suggests a pantomine device rather than a light to live with.

Messrs. Rashleigh Phipps and Dawson endeavour to create an effect by an ingenious employment of glass beads as screens for lamps. They are not singular in using the "Bead-Ray-Diffusers," as they are called, which are merely bags of faceted glass beads strung together with wire or cotton, and slipped over the incandescent lamp bulb. The result is a poor imitation of a cut-glass bulb; and the device must be pronounced a trumpery one. But this firm draw particular attention to their own specialty in glass-ball screens, which consist of a pair of perforated sheets of metal, held (say) half-an-inch apart in a frame, so as to accommodate in the hexagonal perforations glass balls, which can, of course, be arranged in any desired pattern. This may not be a bad idea for a short window-blind, although one would think it would quickly show dust; but it makes very heavy and dim lanterns. Messrs. Rashleigh Phipps and Dawson appeal for notice of their Assyrian Mosque, Italian Dining-Room, and Japanese Drawing-Room lighting; but it occurs to us that a little homely lighting—something less suggestive of the café, the theatre, and the bazaar—would have paid the firm equally well.

Another example of what to avoid in lighting is supplied by Messrs. Graham and Biddle, who have a stand where they show a variety of Oriental pots and pans made into stands for incandescent lamps. We have seen the same thing done much cheaper with a tallow candle and an empty ginger-beer bottle; but we never truly admired the combination. Again, Messrs. F. and C. Osler show a pavilion in which cut and engraved crystal glass is the principal attraction—the electric lighting being a secondary consideration. But even here confusion reigns; for the corners of the pavilion bear statuettes carrying sham oil-lamps, in which the usual flames are replaced by incandesent bulbs. Although their justification is lacking, the oil reservoirs remain in evidence. Some of the least objectionable lamp-fittings in the exhibition are shown by Messrs. Faraday and Son and Messrs. Shirley and Co.

Messrs. Siemens Bros. and Co., Limited, are responsible for an exhibition of lighting in the Pompeian House which is hardly the sort of thing one would expect to see identified with a firm of their standing. All day this well-known apartment is locked up; but at a certain hour, for an extra charge of sixpence per head, the trustful public are admitted to witness an exemplification of theatre lighting by electricity, which is ranked as of sufficient importance to be entered on the daily time table of the Palace. We attended this thrilling spectacle, and, in company with about a dozen other visitors to the Palace (whose admission fees must therefore have swelled the Siemens revenues by several shillings), saw an amiable young gentleman play for about ten minutes with a set of keys, whereby he succeeded, after some delays, in producing several different lighting effects upon a scene displayed in a small model theatre. The idea of demanding admission-money for such a performance is simply preposterous; but not more so, perhaps, than the notion that the electric lighting interest is likely to be advanced by it. It is true that, after a tedious delay in shifting keys and making other clicking arrangements, the amateur showman was able to increase and diminish the brilliancy of the lighting before and behind the scene, and to display "daylight" and "moonlight" effects of the stereotyped character. But seeing that the lighting was much more jerky than that which would have been available by the simple means of a row of gas-burners commanded by a common lever cock, the peculiar value of the show is open to question. After having witnessed this amazing triumph of the electricians' skill in theatre lighting, we are yet of opinion that the average theatre-goer would prefer a dawn that did not come upon him by "leaps and bounds."

It may seem odd that we have been able to write two critical notices of the electric lighting at the Palace Exhibition without mentioning the much-advertised Edison and Swan screen of 10,000 incandescent lamps, which were meant to bewitch all observers; but we hope to deal with this and other matters of an equally pressing nature in the next article.

Fletcher, Russell, and Co., Limited.—In another part of the JOURNAL will be found the prospectus of the Company which has been formed, as announced in our columns last week, to acquire and work, as one concern, the two businesses hitherto carried on by Messrs. T. Fletcher and Co., of Warrington and London, and Messrs. W. and A. C. Russell and Co., of Pendleton and London. The capital consists of £150,000 in shares and £50,000 in debentures. Of the former amount, £50,000 will be in cumulative preference shares of £10 each, bearing 6 per cent. interest, and £100,000 in ordinary £10 shares; but of the latter shares only 7000 will be first issued. The debentures will be for £100 each, and will bear interest at the rate of 5 per cent. The vendors will take 3100 preference and 3800 ordinary shares, fully paid, and debentures for £31,000, in part payment of the purchase-money (£160,000). The remainder of the first issue of shares and debentures—comprising 1900 preference and 3200 ordinary shares and 190 debentures—are now offered to the public. The books of the amalgamated firms have been examined by Messrs. Harmood Banner and Son and Messrs. Thomas, Wade, Guthrie, and Co.; and the latter certify that the average aggregate profits, taken over a period of 3½ years ending Aug. 31, 1891 (from which date the concerns will be acquired by the Company), amounted to £25,877 without allowing for depreciation.

Presentation to Mr. Drury, of Vauxhall.—On Saturday last an interesting presentation was made to Mr. C. D. Drury, who is relinquishing his position as Assistant-Engineer to Mr. C. C. Carpenter, in order to take charge of the Hendon works of the Sunderland Gas Company, to which he has been lately appointed. The testimonial took the form of a handsome half-hunting gold keyless watch, on the case of which was engraved: "Presented by the officers and men of the Vauxhall Gas-Works to Charles Dru Drury, on his retirement from the position of Assistant-Engineer. Feb. 20, 1892." In making the presentation, Mr. Carpenter pointed out what an excellent lesson might be drawn from Mr. Drury's career, by young men such as many of his hearers; and he made reference to the late James Nasmyth's method of selection from his apprentices, by means of an examination of the seats of their trousers, rejecting those where any signs of wear or shininess were apparent. Mr. Drury, in reply, referred to his long association—first as pupil and then as assistant—to his chief, Mr. Carpenter; and he expressed his determination that if any works did get ahead of Vauxhall in its working, it would be those of Sunderland. He concluded with a kindly acknowledgment of the help he had always received from his fellow-officers and men in carrying out his duties; and he expressed his deep regret that the inevitable parting from so many friends had come at last. The meeting then gave three hearty cheers for Mr. Drury, and dispersed.

The Distribution of Power.—In the course of the discussion on the paper by Mr. Joseph Parry upon the supply of power by pressure from public water-mains (*ante*, p. 247), which referred principally to the example of Liverpool, the members of the Institution of Mechanical Engineers debated the question of the comparative cost and efficiency of hydraulic and gas motors, to which allusion had been made by the author. Mr. Jeremiah Head remarked that the paper showed that, when the work to be done is intermittent, the hydraulic system of distribution is of advantage; but when a fairly continuous demand is made upon the motor, the gas or the steam engine is to be preferred for reasons of economy. Mr. E. B. Marten confirmed what was said as to the advantages of hydraulic power for small and intermittent work; but he admitted that it cannot compete with other means of obtaining power for large requirements and constant working. There is, of course, a great advantage when the hydraulic head is obtained by gravitation. Mr. J. Platt testified to the superiority of gas-engines to hydraulic power for constant working; and he pointed out the waste of water that goes on when hydraulic machinery is employed for light loads. Sir J. N. Douglass expressed the opinion that Liverpool gas is too dear. But he confessed that the case is much worse in the United States; and to this circumstance he ascribed the greater extension of the electrical distribution of power in that country. He stated that, with oil at 6d. per gallon, oil-engines will give results equivalent to gas-engines with gas at 1s. 3d. per 1000 cubic feet. He went on to say that, since good oil for hydrocarbon motors can be bought in England for 4½d. per gallon, the cost of power from this source is about half that of gas-engine power at London prices. Very rapid strides have been made of late in the development of the oil-engine; and Sir J. Douglass is one of those who think this class of motor is coming to the front. With regard to electrically-distributed power, it appears, from the tariff prevailing in Liverpool, that the local Electric Supply Company charges after the rate of 5d. per horse power per hour, which puts this source of power out of the market—excepting, perhaps, for the requirements of dentists, &c.

NOTES.

Coke-Breeze Concrete.

Correspondence is still proceeding in the columns of the *Builder* upon the subject of coke-breeze concrete, which is regarded by many architects as a most valuable building material, and a powerful help towards the solution of the problem of "economical and yet substantial labourers' tenements in their own localities." One architect states that he has had some 1-inch yellow deal flooring nailed to 2 inches of coke-breeze concrete, on a bed of brick rubbish and Portland cement concrete gauged 6 to 1. The whole of the concrete was left for a month to dry thoroughly before the floor-boards were nailed down; and the work has stood perfectly for five years—the boards being as solid to walk upon as when they were laid. The boards were not, and ought not to be, tongued. Another architect advises that tongued boarding should not be laid directly upon a flat surface of concrete, for fear of dry rot; but he recommends that sleepers of the breeze concrete should be formed, keeping their surface not less than 1 inch above the general surface of the floor, upon which the boards should be nailed—provision being made for the admission and circulation of air. Particular attention should always be paid to the drying of the concrete before the flooring-boards are laid upon it. The same architect denies that breeze concrete will accumulate heat from flues and fireplaces; asserting that, after years of extensive experience with it, he finds this material "most fire-resisting and incombustible." It is admitted that breeze concrete is about 25 per cent. lighter than ballast concrete. It will satisfactorily encase iron girders if a thickness of at least 1 inch on the soffit is allowed; and it will then take plaster without the needless expense of battens and lathing. The Editor of the *Builder* remarks upon this communication that, with proper care, flooring-boards can be laid direct upon a concrete floor without dry rot supervening, and that the plan of laying the boards with a space between them and the concrete keeps up that system of inaccessible hollows in house building which it is highly desirable to get rid of on sanitary grounds.

Annealing in Coal Gas.

In a communication to the *Engineering and Mining Journal* of America, Mr. H. P. Jones describes a process of annealing metals under non-oxidizing conditions which appears to involve an interesting application of coal gas. It is remarked that the ordinary process of annealing iron and steel consists in bringing the metal to a good red heat, and then allowing it to cool gradually. While the metal is hot, its surface becomes oxidized; and although for many classes of work this scale of oxide is of no practical importance, yet in some instances it is very undesirable, and even necessitates the incurring of considerable expense for its removal. The process in question depends upon the principle of surrounding the metal, while in course of annealing, with an atmosphere of non-oxidizing gas. With this object, the metal is heated in a retort, the interior of which is placed in communication with a supply of coal gas, either taken directly from the main or stored in a gasholder, the gas being perfectly free to expand back into the main or holder—thus keeping the retort under a constant pressure. Although the process is only now disclosed, it has been in use for two years at a works at Hartford (Conn.), during which time several tons of metal have been annealed daily and turned out perfectly bright, at small expense. The retorts used were made of wrought-iron tubes, of sizes suitable to the articles to be treated, and the gas was that supplied by the local Gas Company. Moreover, all the tool steel used in the shop was annealed in the same way, and found to work better in consequence. Experiments have been made to ascertain whether the constituents of coal gas exercise any deleterious effect upon the metal at a red heat; and it has been determined, by direct comparison, that there is practically no difference between the behaviour of specimens treated with coal gas and pure nitrogen.

The Separation of Fresh Air from Dust.

Mr. T. Pridgin Teale, F.R.S., lately read a paper before the Society of Arts upon the ventilation of rooms, and preventing the admission of dust, which he seemed to regard as produced outside. He explained the intrusion of dust particles into cupboards, drawers, &c., as due to air currents produced by incessant variations of atmospheric temperature and pressure. He proposed to make all such receptacles dust-proof by lining the jambs of the doors, the chinks of drawers, &c., with cotton velvet. A model living-room was described, beginning with the fireplace, in the construction of which Mr. Teale's well-known suggestions are, of course, to be carried out. The admission of fresh air to the room would be by means of the "Harding diffuser," which delivers air, filtered through canvas screens, in a number of small jets near the ceiling. The patent for this arrangement has lapsed. Having thus secured a supply of air for the chimney, Mr. Teale proposes to make the windows air-tight by doing away with sashes and making most of the glass a fixture. The window is to be so divided that one-half or one-third shall open inwards on hinges; and all the panes are to be doubled—the inner glass not being puttied, but sprigged upon a cotton-velvet bearing, to keep the intermediate space clean. Mr. Teale's suggestions were received with a good deal of adverse criticism; Sir H. Trueman Wood remarking that the carrying of them out would demand much better workmanship than could be expected in an ordinary house, and another critic pointing out that a great deal of dust arises inside rooms.

The Maintenance of Ropes.

The care of ropes forms the subject of an article in a recent number of the *Engineering Record*. It is remarked that American practice allows of a factor of safety of from 6 to 8 in working wire ropes; but large ropes should not be worked at more than one-tenth of their breaking strength. Careful maintenance is indispensable to the preservation of all rope. Hemp rope needs regular tallowing; while sisal rope should be kept continually damp. Wire rope, particularly of steel, should be paid regularly with a mixture of oil and grease, soft enough to work in between the strands, yet sufficiently stiff to stick on the outside of the rope, laid on hot with a brush. In America the practice is to use vegetable oils rather than animal grease; and where rope is to be exposed, it is not unusual to paint it at the manufactory, and pay it while in use with a mixture of linseed oil and pine tar. Some makers advise the use of a mixture of equal parts of linseed oil and Spanish brown, or lampblack. For wire ropes used under water or below ground, the old recipe of limed tar is recommended; sawdust or oatmeal being sometimes added. Wire ropes fail both from repeated bending and from abrasion; both of which must be duly regarded in proportioning a rope for any purpose.

Nitrogen in Pitch.

At the last meeting of the London Section of the Society of Chemical Industry, Mr. Watson Smith contributed some notes on the "Stability of Certain Organic Nitrogen Compounds occurring in Coal-Tar Pitch." His remarks were based on a very simple, but interesting experiment, which was repeated at the meeting. Some fragments of pitch were placed in the bulb of a tubulated retort, which was inclined in such a manner as to permit the ready egress of products of volatilization. Heat was then applied until the pitch was completely coked. The source of heat was removed, and the retort allowed to cool until it could be handled without inconvenience. On removing the stopper from the neck of the retort, strong fumes of ammonia issued, and were identified by the usual methods. The author assured the audience that no indication of the presence of ammonia could be obtained while the coke was hot; but that the fumes were observed only when it was nearly cold. A repetition of the phenomenon took place on re-heating and again allowing the coke to cool; and as there was no appreciable diminution in the quantity of ammonia evolved after each successive heating, Mr. Watson Smith had not been able to estimate the quantity obtainable from a given weight of pitch. No explanation of the experimental fact was tendered by the author, though he had proved, by attaching a series of drying-tubes to the mouth of the retort while cooling, that the moisture of the air did not play any part in the reaction. The subject was freely discussed; but no reasonable explanation was offered by any of the speakers. The occurrence of the same phenomenon when other organic bodies are coked was affirmed by two gentlemen; and a suggestion that the nitrogen of the air might be concerned in the formation of the ammonia was, curiously enough, not repudiated by the author as improbable. No information of a definite character was elicited as to the possibility of coked pitch furnishing a source of ammonia on a commercial scale; but Mr. Watson Smith was evidently not sanguine of its value for this purpose. It is regrettable that the observer did not work further on the subject before communicating his results to the Society. If, however, his paper should lead to other competent chemists studying the phenomenon, and to a speedy elucidation of its cause and value, its early presentation should be pardoned.

The London Water Bills.—Those of our readers who are interested in the London Water Question will probably be surprised at no indication being given, in our "Parliamentary Intelligence," of the existence of the two Bills promoted jointly by the Corporation of London and the County Council; the other Water and Gas Bills of the session having been fairly started on their way through the Houses. The reason is that the Bills in question were opposed on Standing Orders; and it has been arranged that the matter shall not be considered by the Examiners before the 25th inst.

Death of Dr. Dittmar.—We regret to record the death, on the 9th inst., of Dr. William Dittmar, F.R.S., Professor of Chemistry at Anderson's College, Glasgow, and Lecturer at the Glasgow and West of Scotland College. Professor Dittmar was born at Umstadt, near Darmstadt, in 1833, and studied at Heidelberg under Bunsen, who appointed him as one of his assistants. Shortly afterwards he came to England as an assistant to Sir Henry Roscoe, at Owens College, Manchester. From 1861 to 1869 he was chief assistant in the chemical laboratory of the Edinburgh University. In 1873 he went back to the Owens College as Assistant Lecturer, but returned to Scotland in 1874 as Professor of Chemistry at Anderson's College. Professor Dittmar published several chemical papers on original researches; and also contributed to Watts's "Dictionary of Chemistry" and Liebig's *Handwörterbuch*.

TECHNICAL RECORD.

ILLUMINATING FLAMES.

A Lecture delivered by Professor Vivian B. Lewes, F.I.C., F.C.S., at the London Institution, last Thursday.

Flame has always had an attraction for us which has been rivalled by few other natural phenomena; and whether we look back to the times when the old Fire Worshippers treated it as a deity, or take the present century and trace the work which has been done and the discussions which have been held as to its cause, and the actions which render it luminous or destroy its light-giving power, we are fain to admit that a subject which has drawn to it so much attention for upwards of twenty centuries must be a worthy object for research, until such time as we have mastered every detail that bears upon the subject. It is upon flame that we have, up to the present, always depended for artificial illumination; and whether that flame has been derived from the torch, the rushlight, candle, oil-lamp, or coal gas, it has played a part second to none in our domestic comfort; while with the birth and development of coal gas in the early years of this century, flame became an important commercial factor in the history of the country. It was not until the waning years of the last century that Lavoisier's historical researches upon combustion gave us the key to the action which leads to the formation of flame; and since that time its history has teemed with important researches, and still more important applications, which have to-day borne fruit in the improvements we see on every side in our methods of utilizing flame for both heating and illuminating purposes.

Flame, be it luminous or non-luminous, is produced by the combustion of gaseous matter; and a moment's consideration will render this clear to our minds. Take a piece of Wallsend or Silkstone coal, and note how it burns on the hearth—first swelling and giving out tarry vapours, which ignite and form jets of flame; and these, encircling the coal, carry on the action, and give us the bright mass of flame which renders our English hearth so cheery a companion. On the other hand, take the coke which is derived from this same coal by its destructive distillation in the gas-retort, and watch the clear coke fire as it burns. Here you have no flame of the kind given by the coal, but simply the glowing mass of fuel, with, at most, a small blue lambent flame playing over its surface.

What is it that has happened during the conversion of the coal into coke which made so great a difference in its method of combustion? If we analyze the coal and then the coke formed from it, we can at once trace the cause which has given us in the one case flame and in the other none:—

	Silkstone Coal.	Coke from Silkstone Coal.
Carbon	79·0	89·0
Hydrogen	5·2	1·0
Nitrogen	1·5	1.0
Sulphur	1·5	1·2
Moisture	4·0	1·2
Ash	2·8	5·2
Oxygen	6·0	1·4
	100·0	100·0

The conversion of the coal into coke has been accompanied by the elimination of hydrogen, which, partly free and partly in combination with carbon, has been driven off, and has formed the coal gas; and with the destruction of the constituents capable of forming gas, the property of burning with flame has disappeared. Again, take a piece of pine-wood, and ignite it. Its combustion will be marked by a large and luminous flame; while after conversion into charcoal, by elimination of its gas-producing constituents, it burns with a flameless combustion. From such experiments as these, we are forced to the conviction that flame is gas or vapour undergoing combustion; and inasmuch as combustion is chemical combination, we can define flame as being gaseous matter undergoing active chemical combination.

In all the earlier experiments with flame and with the other phenomena of combustion, it was only those substances which ordinarily burnt in air that were studied and experimented with—those bodies which would burn in air being called combustibles; while oxygen and air were looked upon as supporters of combustion. This conventional limitation of the processes of combustion still exists. A little reflection, however, shows us that such terms must be purely relative; as, if flame depends merely upon active chemical combination taking place between gases, it can only exist where both the combining gases are present, and it cannot matter which of them has the credit of being the combustible, as a jet of air or oxygen will burn just as well in an atmosphere of coal gas or hydrogen as the hydrogen or gas would in air.

It might be imagined that, having come to these conclusions with regard to flame, it would be a comparatively simple matter to solve the other problems connected with it; but, on studying the subject, it is at once found that the physical and chemical actions taking place are of the greatest complexity, and are in many cases governed by laws of which we know but little. In the propagation of flame, for instance, the combination of the inflammable constituents at the first moment of combustion gives rise to a great increase in temperature, which in many cases is sufficient to check and alter the combination, and in some instances even to cause dissociation of the products formed in the earlier phases of combustion; so that the combination seems to take place in waves, and not evenly, as one might at first imagine, with the result that the maximum temperature of a flame is never so great as one would expect from calculations based on the heat of combustion of the gases and the specific heat of the products and residual nitrogen from the air. These points, together with the rate of propagation and burning of gases, have been the subject of historical researches by Bunsen, Déville, Berthelot, and others; but much still remains to be done before we arrive at any final conclusion on the subject.

By far the most interesting, and at the same time important, chapter in the history of flame, however, is the consideration of the causes which lead to the luminosity of those flames upon which we depend for most of our domestic lighting; and these offer so beautiful a field for both physical and chemical research, that they have attracted the attention of many observers, and form no inconsiderable addition to the chemical history of this century. In the year 1816, while engaged upon those celebrated researches which culminated in the discovery of the miner's safety-lamp, Sir Humphry Davy noticed certain facts which led him to work out and propound his theory of the causes which lead to luminosity in flame—a theory which is generally stated as being that the presence of solid particles in the flame is essential to its luminosity. This theory remained unquestioned until 1868, when Professor E. Frankland, in his celebrated communication to the Royal Society, showed that, although incandescent solid matter in a flame renders it luminous, luminosity is also in many cases produced when the flame contains very dense vapours at a sufficiently high temperature, and also that a non-luminous flame may be rendered luminous by increasing the pressure.

This gave rise to a storm of criticism; and the next few years drew forth a rich crop of papers on the subject. Professor Frankland not only showed that flames might be luminous without containing solid particles, but advanced the theory that the luminosity in the flame of a burning gaseous hydrocarbon was due to dense hydrocarbon vapours, and pointed out that the soot deposited upon any cool substance held in such a flame contained hydrogen. To this W. Stein replied, showing that the deposited soot contained less than 1 per cent. of hydrogen which was therefore probably only occluded by the carbon; and also that, if it had been present as a vapour in the flame, it ought, on being heated to the same temperature as the flame, to be once again volatile, which it undoubtedly is not. In the year 1874, Soret attempted to show that the cause of luminosity in flame really does depend upon the presence of solid particles, by focussing the sun's rays upon a luminous flame, and examining the reflected light by means of a Nicol prism; and rather later Burch pursued the same line of research, but employed the spectroscope for his examination of the reflected light. Their results point unmistakeably to the presence of solid particles; and at the present time I think there is very little doubt in anyone's mind that, as far as the flames of candles, oil, and gas are concerned, Sir Humphry Davy's theory is the correct one. Indeed, I am strongly of opinion that, although in certain points Davy went a little too far in his theory, had he been still among us we should have found that, in his own mind, he applied his theory more especially to the flames of our ordinary illuminants, as in his original memoir he speaks of "common flames," and distinctly says that "when in flames pure gaseous matter is burnt, the light is extremely feeble," and again, "the intensity of the light of flames depends *principally* upon the production and ignition of solid matter."

While this war of solid particles *versus* dense vapours was raging, Hilgard, Landolt, Blochmann, and Heumann were trying to trace the chemical actions taking place in various flames, and the causes which led to loss of luminosity when air was mixed with coal gas before combustion in the Bunsen burner. Heumann added the further proof to the "solid particle" theory of luminosity, that all flames which owe their luminosity to incandescent solid matter give definite shadows, while those in which luminosity is due to dense vapours, give none; and that candle, oil, and gas flames all cause well-defined shadows.

This brings the work done upon the cause of luminosity down to the present time. The accepted description of a luminous flame now is that it consists of several zones—an inner one, in which no combustion is taking place; a central one, in which, either by selective combustion or by direct decomposition by heat, carbon or very dense hydrocarbons are liberated, and, being heated to incandescence at the moment of production by the combustion of other gases present in the flame, give it luminosity; and an outer one, which consists of the products of combustion and atmospheric air heated to incandescence, and in which combustion is complete.

The work of Soret, Burch, and Heumann proves beyond doubt that our ordinary illuminating flames contain in the luminous zone particles of solid matter; and the only solid which could be present is carbon, either pure or containing the merest trace of hydrogen. The chief question now remaining to be solved, consequently, is the action taking place which leads to the formation of the solid particles in the luminous zone of the flame. During the last two years, I have devoted a very

considerable amount of time and attention to the study of this subject; and I think I have found the key to this important problem—important from a practical point of view, because, until it is thoroughly solved, all efforts to improve our illuminating gases, and the burners in which we consume them, can only be the outcome of experiments made without definite idea of the means to employ in order to obtain the results we desire.

Coal gas is a mixture of hydrocarbons with hydrogen and small quantities of carbon monoxide; and it also contains traces of carbon dioxide, nitrogen, and oxygen. The gas manager, however, does his utmost to eliminate the last three, which, if present in anything but the merest traces, would seriously injure the illuminating value of the gas. An analysis of the South Metropolitan Company's gas gives the following as its composition:—

Hydrogen	57·08
Hydrocarbons—	
Unsaturated (containing 0·035 p. c. of acetylene)	4·38
Saturated	33·99
Carbon monoxide	2·63
Carbon dioxide	0·79
Nitrogen	0·96
Oxygen	0·15
Bisulphide of carbon	0·02
	100·00

The unsaturated hydrocarbons consist of ethylene, benzene, propylene, butylene, and acetylene, and probably also traces of crotonylene and others; while the saturated hydrocarbons consist chiefly of methane, with traces of ethane, propane, and butane.

Analyses made by Landolt of gases withdrawn from various parts of a luminous coal-gas flame, and also a long series of analyses which I have made, show that, as the gas leaves the burner, the hydrogen is the first to be consumed; and that, in the passage up the non-luminous part of the flame, the carbon monoxide largely increases in quantity, while at the same time the methane rapidly decreases, and the unsaturated hydrocarbons seem to be the least affected. In the luminous zone the unsaturated hydrocarbons rapidly disappear; while the carbon monoxide formed in the inner zone, and also the residual hydrogen and methane, undergo combustion. Professor Smithells, in a paper read before the Chemical Society in December last,* also proved that, during the incomplete combustion taking place in the inner cone of a Bunsen flame, this same increase in the amount of carbon monoxide was to be observed. The fact that the decrease in quantity of the unsaturated hydrocarbons was but slow in the inner zone, and then took place with considerable rapidity in the luminous zone, favoured the theory that they were broken up by heat in that portion of the flame, and liberated the carbon, which by its incandescence gave the luminosity. But it does not seem to have occurred to anyone to try to determine whether the unsaturated hydrocarbons at the top of the non-luminous zone were of the same description as those in the coal gas.

It is a matter of common observation that the checked combustion of a luminous flame at once gives rise to the escape of acetylene, and also that, if a Bunsen burner catches light at the bottom, large quantities of acetylene are formed, of which the presence is at once detected by its distinctive and pungent odour. These facts suggested the idea that, in the inner cone of the flame, acetylene might be formed by decomposition of the original hydrocarbons; and experiment at once showed this to be the case. Of the unsaturated hydrocarbons present in coal gas, 0·8 per cent. consist of acetylene; while at the top of the non-luminous zone of a flat flame produced from the same gas, between 80 and 90 per cent. of unsaturated hydrocarbons present consist of acetylene; and in all the other luminous flames experimented with, the same action was found to take place.

On taking the most important hydrocarbons present in the coal gas, mixing them with about 20 per cent. of air, and passing them through a tube heated to the temperature existing near the top of the inner non-luminous zone, the following results were obtained: Methane gave rise to unsaturated hydrocarbons, acetylene, and carbon monoxide; ethylene gave acetylene and carbon monoxide; hydrogen charged with benzene vapour gave the same; and ethane gave unsaturated hydrocarbons, acetylene, and carbon monoxide. These experiments clearly show that, in the inner non-luminous zone of the flame, the heat generated by combustion of the hydrogen of the coal gas in the presence of the small proportion of air drawn into the flame at this point, causes the conversion of the hydrocarbons present in the gas into acetylene and carbon monoxide.

Acetylene is a clear colourless gas, with a strong and disagreeable odour. It consists of 24 parts by weight of carbon, combined with 2 parts by weight of hydrogen. It is one of those bodies which, during their formation, take in heat instead of giving it out; and it is therefore called an "endothermic" compound. Such substances are especially liable to decomposition, as this is accompanied by a rise in temperature instead of, as is the case with most decompositions, an absorption of heat. Acetylene is decomposed at a bright red heat into carbon and hydrogen, together with traces of tarry matter as well as ethylene; while Berthelot has shown it to be so unstable that it can be broken up into carbon and hydrogen by detonating a percussion cap in it.

* See *ante*, p. 68.

These important points being established, it is necessary to ascertain if the temperature existing in the various parts of a flame give any clue to the actions going on within them. The beautiful platinum and platinum-rhodium thermo-couple devised by M. Le Chatelier, and introduced to us by Mr. W. Chandler Roberts-Austen, gives a means of measuring the temperatures of flames with an ease and comparative accuracy which was never before hoped for. I made a small thermo-couple of platinum and 10 per cent. of rhodium, platinum wire, using it as thin as possible to reduce errors from loss of heat by conduction, and keeping the wires of considerable length to prevent any chance of rise of temperature introducing conflicting currents at the connections with the galvanometer wires. A reflecting galvanometer was employed, and sufficient resistance was introduced into the circuit to keep the spot of light upon the scale at the highest temperature of the flame; and the scale was then graduated for temperature by taking water at 0° and 100° C., and checking the higher temperature by the fusing-points of the chlorides of the alkalies and alkaline earths, as determined by Dr. Carnelly.

With this arrangement I was able to map out the temperatures existing in the flat flame in which I had traced out the changes taking place in the constituents of the gas; and I found that the temperature rapidly rose from 500° C. half an inch above the burner, to a little over 1200° C. at the commencement of the luminous zone—the luminous edges having a temperature of 1216° C.; and these temperatures were further increased in the luminous zone until near the top of the flame 1368° C. was reached. This at once gives us the secret of the luminosity. From the mouth of the jet and up to a temperature of 1000° to 1200° C., we have the formation of acetylene from the original hydrocarbons; but the moment the requisite temperature is reached by the combustion of the hydrogen and the carbon monoxide, the acetylene decomposes, with a further rise of temperature, and the carbon heated to incandescence radiates heat and light.

If a luminous flame be cooled, its luminosity is at once diminished, and may be destroyed; while, as the propagation of flame requires a certain temperature, a further cooling will extinguish it. In the outer edge of a flame, the rapid inrush of air sucked into the flame so lowers the temperature that a thin envelope is rendered non-luminous, the actions checked, and traces of the gas allowed to escape unconsumed by the extinction of the extreme limit of the flame; and delicate analysis shows that every luminous flame burning freely in air gives off distinct traces of carbon monoxide, acetylene, and even such highly-inflammable gases as methane and hydrogen.

Ever since the structure of flame has been noted and discussed, it has been accepted as a fact beyond dispute that the outer almost invisible zone which is interposed between the air and the luminous zone of the flame, is the area of complete combustion, and that here the unburnt remnants of the flame gases, meeting the air, freely take up oxygen, and are converted into the comparatively harmless products of combustion, carbon dioxide and water vapour, which only need partial removal by any hap-hazard process of ventilation to keep the air of a room fit to support animal life. The facts I have brought before you show that this is not the case; and they fully explain why gas is so oppressive in a badly-ventilated apartment.

It has always been the custom to speak of flame as built up of zones; and although there are no sharp lines of demarcation, in the actions taking place, which would warrant this, still three distinct portions are visible to the eye. If we divide the luminous flame into zones, it would be perhaps best looked upon as consisting of three, viz.—

(1) The inner zone, in which the temperature rises from a comparatively low point at the mouth of the burner to about 1000° C., at the apex of the zone. In this portion of the flame, the constituents of the gas undergo various decompositions and interactions, which culminate in the conversion of the heavier hydrocarbons into acetylene—carbon monoxide being also produced; and these, with the products of combustion and residual hydrogen, pass into the next phase of action.

(2) The luminous zone, in which the temperature ranges from 1000° C. up to a little over 1300° C. Here the acetylene formed in the inner zone becomes decomposed by heat, with liberation of carbon, which at the moment of production is heated to incandescence by the combustion of the carbon monoxide and hydrogen, and gives luminosity to the flame.

(3) The extreme outer zone, in which, combustion being nearly completed, the cooling and diluting influence of the entering air renders a thin layer of the flame non-luminous, and finally extinguishes it. With ordinary coal gas, this results in the escape of traces of hydrogen, methane, carbon monoxide, and acetylene; while with a very rich gas unconsumed carbon also escapes.

This description of a luminous flame is of necessity far from complete, as it leaves out of consideration the interactions which lead to the formation of acetylene, and also the decompositions going on in the various parts of the flame between the products of combustion and the flame gases; but I think it marks a considerable advance in our knowledge of the main

actions which lead to luminosity—the other interactions being at best subsidiary to it.

Having obtained a clear idea of the causes which lead to luminosity in flame, we are enabled for the first time to clearly understand the actions taking place in the atmospheric or Bunsen burner, the invention of which revolutionized our methods of heating by gas, and made coal gas one of the most important of our domestic fuels.

When it was first found that the admixture of a certain proportion of air with coal gas before combustion caused it to burn with a non-luminous flame, it was at once accepted, as an explanation of the phenomenon, that the extra oxygen so led into the inner cone of the flame, by causing complete combustion in the central zone, burnt up the carbon before it could be heated to incandescence, and so destroyed its light-giving power. Some years later, however, Knapp and others showed that, by mingling inert diluents, such as nitrogen, carbon dioxide, or even steam, with the gas before combustion, non-luminosity could be produced. It was then recognized that the diluting and cooling action of the nitrogen in air played an important part; and some observers held that it was this, and not the oxygen, which was the cause of non-luminosity.

On measuring the amount of air and of nitrogen respectively able to render a Bunsen flame non-luminous, they are found to be practically the same, while the quantity of oxygen present in the air used, when passed into the gas by itself, still gives a very luminous flame. This certainly looks as if it were the nitrogen that was doing the work. If this were so, the temperature of the flame rendered non-luminous by nitrogen should be the same as that of the flame rendered non-luminous by air; but, on testing these, the fallacy of such a supposition is at once exposed. This will be seen by the following table:—

Part of Flame.	Temperatures existing in a Bunsen Flame rendered Non-Luminous by— Nitrogen.	Air.
½ inch above burner	30° C.	54° C.
1½ inches above burner	111°	175°
Tip of inner cone	444°	1090°
Centre of inner cone	999°	1533°
Tip of outer cone	1151°	1175°

These temperatures clearly show that a very considerable amount of combustion is due to the oxygen of the air, and make it perfectly manifest that both the oxygen and the nitrogen are acting in bringing about the loss of luminosity.

While working at these points, I found that if mixtures of nitrogen and oxygen, poorer in oxygen than air, were employed, it was practically only the nitrogen which acted—the diluting effect being so strong that the oxygen was prevented from taking any active part. With air, both act; while with mixtures richer in oxygen than air, the oxygen alone acts—the nitrogen being apparently unable to exercise any retarding influence. The same result is obtained if excess of air is mixed with the gas before combustion. If the quantity of air reaches a point at which the proportion of oxygen in the air is to the gas as 0·5 : 1, then the diluting influence of the nitrogen is lost, and the appearance of the flame becomes entirely altered. The normal Bunsen flame burns with a lilac-coloured inner and blue outer zone; but the moment the quantity of air admitted reaches the ratio mentioned, the flame becomes short and fierce, and the inner zone changes to a greenish colour—the highest temperature in the flame at the same time increasing by nearly 100° C. Experiments show that the nitrogen acts in the normal Bunsen flame by so diluting and protecting the hydrocarbons that a far higher temperature is needed for their decomposition; and this action gives time for the oxygen of the air to consume them without liberation of carbon, and hence without luminosity.

In conclusion, I think that we may express the actions which lead to the loss of luminosity in the normal Bunsen flame in the following way:—

(1) The chemical activity of the oxygen introduced in the air, which, by burning up the molecules of hydrocarbons before, in their diluted condition, they undergo decomposition, causes loss of luminosity.

(2) The diluting action of the nitrogen of the air, which, by increasing the temperature necessary to bring about the partial decomposition of the hydrocarbons, prevents formation of acetylene, and in this way will, by itself, cause non-luminosity; and in the normal Bunsen flame it acts by doing this until destruction of the hydrocarbons by oxidation has taken place.

(3) The cooling influence of the air introduced, which is able to add to the general result, although the cooling is less than the increase in temperature brought about by the oxidation due to the oxygen in the air.

The Use of Liquid Fuel for Heating and Lighting Purposes.—The *Financial News* understands that a Syndicate is in course of formation for the purpose of acquiring several valuable patents in connection with the use of liquid fuel for heating and lighting purposes. The processes to be employed are quite new; and they have, it is stated, been tested at Glasgow and elsewhere, where they have been found completely satisfactory.

REGISTER OF PATENTS.

Valve Gearing of Gas-Engines.—Boult, A. J.; communicated from the Berliner Maschinenbau-Aktien-Gesellschaft, of Berlin. No. 383; Jan. 8, 1891. [8d.]

This invention relates to the employment in gas and other like engines of a reciprocating bell-crank lever, adapted to be turned upon its pivot by means of a pawl or tappet at each stroke of the slide; its angle of oscillation being limited by a stop, so that, when its arm is allowed freely to descend, it thereby actuates the inlet for the gas supply. It also includes, in valve gear for gas-engines, the combination with the bell-crank lever and tappet of an adjustable balance weight or spring, whereby the movement of the arm may be properly timed so as to control the speed of the engine.

Conveying Combustible Gas to Boilers, Kilns, Furnaces, &c.—Rylands, D., and Potter, R., of Stairfoot, near Barnsley. No. 764; Jan. 15, 1891. [8d.]

This invention has for its object the "securing of a better and more even combustion of the gases used in gas-fired boilers, kilns, furnaces, &c., together with greater economy in fuel and more durable construction than hitherto." To this end, the gas as made in the producer is passed into a flue made of fire-brick or other suitable material. Into this flue, there is introduced or suspended a tube, made of wrought iron or other suitable substance, through which air is made to travel to the point of combustion, while the hot gases from the producer are conveyed in the outer flue—thereby heating the inner tube and the air which is being passed through it. At the points where it is required to ignite the gas, short branch-flues are arranged, to convey the gas and hot air under or through the boilers or into the kiln. These branch-flues are connected to a combined igniting port made in three compartments; the centre compartment being for hot air, the second for gas, and the outer for the air—thus securing a thorough admixture of the particles of combustion. The branch pipes and flues are, of course, all fitted with suitable valves for regulating and controlling the supply of gas and hot air.

Gas Cooking Appliances.—Darwin, H., and Guthrie, J., of Glasgow. No. 767; Jan. 15, 1891. [8d.]

This invention relating to gas cooking appliances has for its objects: To increase the utility of a gas grill; to reduce the consumption of gas therein; to simplify the conversion of a deflecting gas grill into a boiling appliance; to prevent the accidental fouling of burners in gas cooking appliances; to adapt the ribs or bars of a gas hob for being quickly and thoroughly heated; and to increase the heat arresting and refracting power of the grill deflecting-plates.

The grilling mechanism (when it consists of three parallel tube burners, placed horizontally between deflecting-panels) is made with a lever movement for oscillating the two outer tube burners, and enabling their lighted jets to be turned beneath the deflecting-panels for grilling, or above them for boiling purposes, alternately as required; and when the outside burners are turned up from their grilling positions to those required for boiling, the supply of gas is simultaneously cut off from the middle burner by the same lever movement. Also when the two outside burners are revolved into their grilling positions, the supply of gas is, by the same lever movement, restored to the middle burner.

Gas-Engine Piston-Rings.—Wertenbruch, F., of Nottingham. No. 3682; Feb. 28, 1891. [8d.]

This invention relates mainly to the moveable piston rings or valves of gas-engines, having automatic action to close passages leading to a hollow trunk or a chamber in which the explosions take place, so as to act against a larger piston; the chamber or hollow trunk serving also as the receiving and compression chamber. For this purpose the patentee prefers to make the trunk connecting the two pistons hollow; and by passages at the upper part to make communication with the space in the larger diameter cylinder. The bottom of the trunk is smaller in diameter than the cylinder in which it works, and is encircled by a ring, piston, or valve, which fits the cylinder. This has free play, within certain limits, to open passages through which the mixture has to pass and become compressed, and also to close the passages for the ignition and working or power stroke. The piston-rings proper may be of wire coiled and faced up.

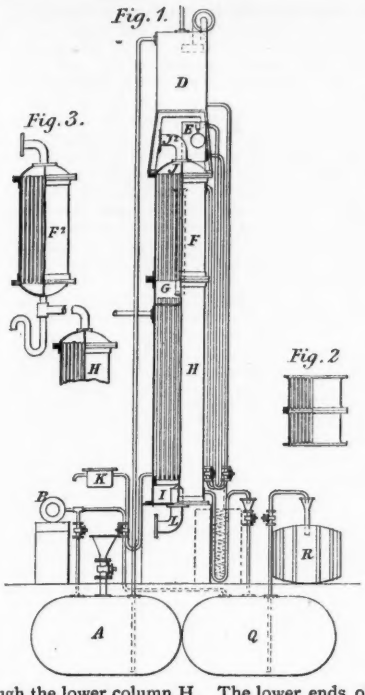
Carburetting Gas or Air.—Lennard, F., of East Greenwich. No. 3716; March 4, 1891. [8d.]

This invention has for its object to provide apparatus by means of which gas or air can be carburetted or impregnated with matter with which it is desired to treat it; the apparatus being applicable generally in cases where it is desired to distil, or evaporate off the volatile constituents of liquids.

In this apparatus as constructed for the purpose, the liquid to be evaporated, distilled, or concentrated is passed through tubes in such a manner that it is very efficiently subjected to the action of heat applied by steam or otherwise. The gas or air, after being carburetted or impregnated, or the vapours from the liquid being evaporated, distilled, or concentrated, are preferably passed upwards through another tubular arrangement, to effect the preheating of the liquid to be subjected to the action of heat in the tubes.

Fig. 1 shows in elevation (partly in section) an apparatus constructed according to this invention.

A is a storeage vessel for petroleum, naphtha, or other liquid. It has a funnel, by which it is filled, fitted with a stop-cock, which is closed when the vessel is filled. By means of a pump B, pressure is exerted upon the liquid in the vessel, so that it is forced up into the tank D, from which it passes into a receiving tank E; the inlet of the pipe into the tank being provided with a ball-cock, for keeping a proper level of the liquid therein. The liquid then passes into the top part of the upper column F, in which it becomes preheated by the hot vapours escaping from the lower column H; and then the liquid overflows and travels down into a space G, into which project the upper ends of tubes



passing through the lower column H. The lower ends of these tubes communicate with the space I below the lower column; the plates through which the tubes pass separating the main part of the interior of the lower column H from the spaces G and I above and below. The top and bottom plates of the upper column F separate the interior of this column from the space G below, and the space J above it. Tubes pass through these plates, so as to form a communication from the space G to the space J. The liquid which passes from the pipe through the perforated lower end thereof, rises in the space G until it overflows at the tops of the tubes of the lower column, so that, as the liquid runs in thin sheets (or films) down the interiors of the tubes, volatile matters are driven off; the driving off of the required product being effected by the heat applied to the exteriors of the tubes. This heating may be done by steam admitted into the column H; the water of condensation passing away by the steam-trap K.

If air or gas is to be carburetted, it is admitted, under pressure, by the pipe L projecting into the space I, as shown; and on rising through the tubes, it comes into contact with the descending films of liquid passing down the internal sides of the tubes. The air or gas thus takes up the volatile products which are given off from the liquid, which is heated not only by the heating agent in the lower column H outside the tubes, but also (before the matter enters the space G) by the escaping hot carburetted gases or vapours which pass up through the interiors of the tubes into the space J above it, and thence by an outlet-pipe J^2 to the place of utilization or storeage.

In evaporating, distilling, or concentrating, the heating effect of the steam on the column H may be supplemented or replaced by the heat of hot air or gas admitted through the pipe L. The pipes by which the liquid passes to and from the tanks preferably descend (as shown) to a low level, and then rise again, so as to enable regulating-cocks thereon to be brought into convenient position for manipulation.

In order that the liquid may be further preheated before it enters the column F, the arrangement shown in dotted lines may be used; the lower end of the pipe being carried down and attached, at its lower end, to a closed vessel, from which the upward continuation of the pipe ascends to the tank E, so that the liquid passes through the vessel on its way from the descending to the ascending part of the pipe.

The supply of liquid from the tanks is regulated so that it passes into the tubes of the lower column in sufficient quantity to form only thin films passing down the interiors of the tubes. To ensure that the liquid is properly subjected to the action of the heating agent, or air or gas, the patentee makes the lower column of a number of sections, each with tubes, and with spaces between the sections; the tubes rising into these spaces, and being set alternately in different vertical planes, so that any liquid which flows down (say) the mid-part of a tube, will pass down a tube below it in contact therewith. This is shown with regard to two sections in fig. 2. The heating agent may be supplied to the sections, outside the tubes, either separately to each section, or so as to pass from section to section. In the arrangement shown in fig. 1, any liquid resulting from condensation in the tubes will pass down the tubes; but if it be desired to retain the result of such condensation separately, the top of the column H is closed in, as shown in fig. 3, and the vapours are led from the column H into the tubular condenser F^3—the liquid resulting from condensation in this condenser being obtained separately, and drawn off by a syphon. The liquid to be treated may, of course, be preheated, if desired, by being used as the condensing agent in the condenser F^3. Similarly, the vapours from the condenser F^3 may be passed into other condensers, to obtain further fractions.

Making Gas and a Product therefrom.—Dyson, W., of Oldcoates, Notts. No. 3862; March 4, 1891. [4d.]

This invention, says the patentee, relates to "improvements in the manufacture of coal gas, such as is used for lighting and other purposes; and in the production of a composition or material during such gas manufacture which forms a valuable tillage."

In carrying out his idea, the patentee proposed to "cause the crude or unpurified gas, during the process of manufacture, to pass through purifying tanks or chambers filled with peat-moss, in place of the usual water-tanks. The gas, while forcing its way through the fibres of the moss, parts with the ammonia that is being carried along with it; and the process of extraction or separation of the ammonia is effected in a more complete and perfect manner than by water. The peat-moss having performed its duty and become charged with ammonia separated from the gas in its passage through it, is then treated with sulphuric acid, thereby fixing the ammonia. A high-class tillage or manure, being a very valuable product, is then produced."

The claims for the "invention" are: (1) In the manufacture of coal gas, causing the crude gas to pass through an enclosed mass of peat-moss, instead of through water, to more effectually separate the ammonia therefrom. (2) The production of a material for tillage purposes, consisting of peat-moss charged with ammonia, by passing the crude gas during the manufacture of carburetted hydrogen gas (or ordinary coal gas) through an enclosed mass of peat-moss and fixed by a treatment of sulphuric acid.

Sulphate of Ammonia Plant.—Marriott, C., of Redcar. No. 4730; March 17, 1891. [8d.]

This invention in sulphate plant relates to means whereby the salt is continuously "fished" or removed from the saturator by self-acting means.

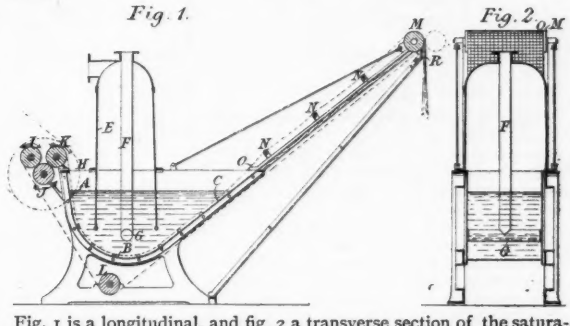


Fig. 1 is a longitudinal, and fig. 2 a transverse section of the saturator, the body of which has a vertical or nearly vertical back A, a radial bottom B, an inclined front, and a bell E in which the waste gases collect. Through the centre of the bell, in a vertical position, is the ammoniacal gas or saturator pipe F, terminating at the bottom in a perforated T-pipe G, the T end being a short distance above the bottom, and immediately over the radial part B; a space H being left between the outside of the bell and the back of the vessel. At the back of the saturator are three or more driving or drawing rollers I J K; and underneath and outside the vessel a carrying roller L. In front of the apparatus, in line with the inclined front, and at any convenient distance, is another carrying roller M; and at suitable intervals down the inclined part are other small rollers N, all working in bearings in the framework. Over the rollers is an endless apron O (the full width of the inside of the vessel), made of wire gauze of suitable mesh; the apron being of such length that it passes over and under the driving or drawing rollers, down the vertical or nearly vertical back, along the radial bottom, under the T-pipe and bell, up the inclined front, over the roller at the top, and back under the roller L, underneath the vessel, and again to the driving or drawing rollers I J K, which are driven from any convenient source, and thus give the apron a travelling motion.

The action of the apparatus is as follows: The saturator being charged with acid to a suitable depth, and the ammoniacal gas being put in communication, the salt as it is formed is deposited on the travelling apron, and is continuously carried on it or "fished" out of the vessel up the inclined front; being drained in its passage of any surplus liquor, which flows back into the saturator—the acid being kept at one constant level by any well-known means. Underneath the roller M, at the top of the inclined front, and in contact, or nearly so, with the endless apron, is a stationary knife or scraper R, to remove the salt from it, to fall into any convenient place; or a stationary or revolving brush may, when desired, be used for the same purpose.

Manufacture of Gas.—Kitson, A., of Philadelphia, U.S.A. No.17,557; Oct. 14, 1891. [8d.]

The subject matter of this patent has of late received a considerable amount of attention in our columns—see the article, on "Fuel Gas: Its Production and Distribution," commenced in the JOURNAL for Jan. 19 (p. 112). The invention relates to an improved gas generating furnace, adapted more particularly for generating fuel gas for domestic heating and cooking and for manufacturing purposes.

One object of the invention is to provide for more certainly passing steam and air down through the body of heated fuel, and conducting the resulting gases away centrally through the moveable grate or hearth. Other objects of the invention are: To provide an improved construction and arrangement of the mechanism for imparting to the grate or hearth which supports the coal a rotary and a vertical up-and-down motion, for removing ash and cinder at the peripheral opening, and for causing the coal to properly feed downwardly, and prevent it from caking in case bituminous or soft coal is used; to provide in connection with the moveable hearth or grate, a circle of dependent vertical bars, suitably spaced for permitting the escape of dust and ashes when the hearth is lowered below the fuel chamber, but serving to retain the fuel on the hearth so that the fire may be properly cleaned without waste of the incandescent fuel; to provide for dumping ash and cinder from the ash-pit into the water-seal chamber, thereby preventing the escape of gaseous products during such operation, and also preventing dust and ashes from flying about in the generator-room; to provide for cooling the iron division-plate between the fuel chamber and ash-pit, and utilizing the heat radiated from the grate and ash-pit for

heating air which is supplied to the fuel chamber through the steam-injector; to provide an effective arrangement of air-heating flues in the wall of the generator and connecting injectors for forcing hot air either up or down and into the top or bottom of the generator; and, lastly, to obtain a uniform volume of steam at a perfectly steady pressure for forcing air, by means of an injector, into the fuel chamber, or for other urposes.

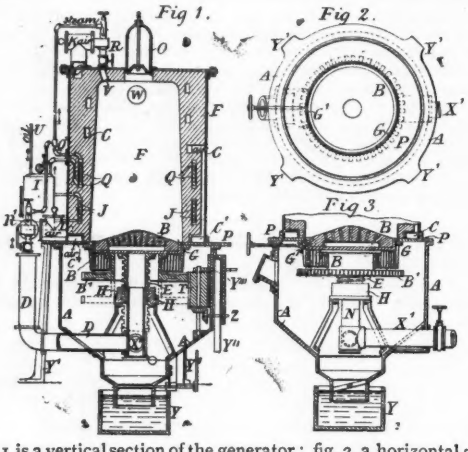


Fig. 1 is a vertical section of the generator; fig. 2, a horizontal section above the hearth; and fig. 3, a vertical section of the base of the generator taken at right angles to fig. 1.

The walls of the furnace F are constructed of fire-brick, and enclosed in an iron jacket in the usual manner. The fuel chamber is provided at the bottom with an annular iron plate P, supported npon the iron columns Y^1. The iron ash chamber A, and circle of vertical grate bars G are also bolted to the annular plate, and suspended therefrom. The ash chamber is provided at the bottom with a downwardly extending passage or opening furnished with a valve having a handle for the removal of ashes. It also has a door for giving access to the interior for cleaning or inspecting the gearing and other mechanism connected with the grate or hearth. Below the valved passage is placed a vessel Y to contain water, into which vessel the passage dips, so as to form a gas-tight seal. The ash is dumped into the vessel Y, preventing its escape into the room containing the generator.

The grate or hearth is provided with means for giving it both a rotary and a vertical up-and-down motion; and it has a central passage way through it connected (by pipes passing through the ash-pit) with the gas-escape pipe and with a supply-pipe for the air and steam. There is also an opening between the periphery of the hearth and the wall of the furnace for the removal of ash and cinder; thus permitting them to be shaken out while gas is being passed off through the central opening and the pipe leading therefrom through the ash-pit. The hearth is preferably made of iron, having a turned up circumferential flange, and filled in or covered over with fire-brick, as shown. It is provided centrally with an opening, and above the opening with ports. The grate or hearth is connected to, or supported centrally by, the short hollow screw-shaft E, having a central opening mounted in the collar or hub H, which is internally screw-threaded and supported by the legs. The screw-threads upon the shaft are large and strong, so as to withstand the pressure of the body of coal resting upon the hearth. To the under side of the hearth, there is bolted a large annular hub, carrying at its lower end the large toothed gear-wheel B^1, arranged to mesh with the long pinion T (mounted on a shaft), by means of which the hearth is rotated and raised or lowered. The shaft is journalled top and bottom, and has secured to it a bevelled gear-wheel, meshing with the bevelled gear, and secured to the inner end of the horizontal shaft Z, which is provided at its outer end with a gear-wheel Y^2, with which there meshes a pinion Y^3. By means of this mechanism, the hearth is readily rotated and raised or lowered, according to the direction in which the gearing is turned. The object of these two motions is to thoroughly shake up the fuel, and to provide for more effectively using bituminous or soft coal in the generator.

It will be understood that as the hearth B, and the toothed wheel B^1, are turned in one direction, the screw-shaft E will be traversed upward through the hub H; and if turned in the other direction, will be traversed downward through the hub, so as to raise and lower the hearth. The hollow screw-shaft E fitting in the hub is simple in construction and positive in action; so that the hearth cannot stick when it is desired to move it either up or down. A short vertical pipe N, having two elbows or branches at its lower end, projects into the passage of the screw-shaft E, fitting loosely therein, so that the shaft may be readily turned around it.

At the base of the fuel chamber F, there is secured to the under side of the annular plate P, the circular grate G, surrounding the vertically moveable hearth B, and having dependent bars suitably spaced apart to permit the escape of ashes when the hearth is lowered, but serving to retain the incandescent fuel. A section or segment G^1, of the grate is made moveable, and has loosely connected with it the end of a screw-shaft, so as to form a swivel joint. Guide ways, properly flanged or grooved, are secured to the under side of the plate P, for supporting the segment G^1, and permitting it to be slid out and in by means of a screw. For the purpose of removing clinker from the hearth and fuel chamber, the segment G^1 is drawn out by the screw, leaving an opening through which the clinker may be raked or shaken out by the moveable hearth. After the fire has been cleaned, the segment is again secured in its place adjacent to the hearth. The water-circulating and steam-generating coils J are preferably arranged in a channel formed in the brick lining at or near the base of the fuel chamber F, and are enclosed in such channel by suitable tiles.

The patentee also arranges in the furnace walls a coil Q for superheating steam; and both sets of coils J and Q are connected by means of an intermediate reservoir I, at the side of the generator, and adapted to contain the feed water supplied to the coil J, and the steam generated in such coil and supplied to the superheating coil Q. The outlet end of the coil Q is connected with the upper injector R, and by a branch-pipe with the lower injector R^1. The air-supply box K, provided with a removeable lid or slide, connects with the upper injector, and also with a hot-air flue C, at the top of the furnace. The lower injector connects with an air-supply box L, having a removeable lid or slide, and connecting with the lower end of the hot-air flue C, or annular box C^1. The lower injector opens into the supply-pipe D, connecting with the interior of the fuel chamber through the central opening in the hearth. The hot-air flue C is formed spirally in the brickwork of the furnace, and may be lined with metal or formed of metallic tubing, if desired. An annular air-box C^1 is preferably placed adjacent to the plate P, above the ash-pit for the circulation of air, which keeps the plate and hearth sufficiently cool, while the excess of heat is utilized for heating the air which is supplied to the injectors. The box C^1 connects with the air-heating flues C, as shown in fig. 1.

The upper injector is connected with the top of the furnace by an inlet passage V. When the furnace is in operation, and the steam is supplied to the injectors under suitable pressure, air is admitted into the top of the flue C, in which case it will flow downward, and be heated in its passage through the flue, and will then flow through the box L to the injector R^1, for supplying the base of the fuel chamber. In case it is desired to supply air to the top of the furnace, the injector R is put in operation; and the lid of the box L being removed, air is admitted into the box C^1 and the lower end of the flue C, so that it is heated by passing up through the flue and finally escapes through the box K, injector R, and supply-passage V, into the top of the furnace. The gas take-off pipe W leads from the top of the furnace to a chimney (not shown); and a pipe provided with a valve may lead from the pipe W to the holder, or the place where the gas is to be burned.

The fuel-supply hopper O is connected at the top of the furnace, and is provided with a valve for admitting fuel as required. The bottom of the fuel chamber is made of greater diameter than its upper portion; so that, when the hearth P is lowered, the entire weight of the fuel exerts its full pressure downward, unchecked by friction, against the side walls of the furnace. This provides for readily cleaning the fire; and in case bituminous coal is used, any bridge or arch formed in the upper portion of the fuel is readily broken. After the hearth has been lowered, it is then raised to its normal position; thereby compacting the fuel into a body of uniform density, and preventing the formation of blow holes or cavities, and securing more uniform action of the air and steam on the fuel, resulting in a better production of gas. In order to better mix a fresh charge of coal with the body of incandescent fuel in the furnace, the hearth may be lowered by turning the toothed wheel B^1 in the right direction (after first having introduced a fresh charge of coal), and then again rapidly turning and raising the hearth. The fresh fuel thus becomes mixed with the incandescent coal, and forms a compact body.

APPLICATIONS FOR LETTERS PATENT.

1879.—Barker, T. B., and Rollason, E., "Gas-bags for gas-engines." Feb. 1.

1909.—Livesey, G. T., "Preventing the freezing of water in the cups or lutes of gasholders, and for other similar purposes." Feb. 1.

1958.—Coultas, W., Siddell, T., and Smith, J. L., "Combined boiler and gas-producer for the generation of steam and production of gas, whether used in combination or for separate purposes." Feb. 2.

2005.—Cattell, C. F., "Gas-generators." Feb. 2.

2047.—Price, J., jun., "Pipe joints." Feb. 2.

2065.—Wright, F. G., "Liquid meter." Feb. 3.

2073.—Wilson, W. H., "Manufacture of illuminating gas." Feb. 3.

2181.—Atkinson, J., "Self-starting apparatus for gas and other internal combustion motors." Feb. 4.

2204.—Smith, W. E., "Burning liquid hydrocarbons for heating and lighting purposes, and apparatus therefor." Feb. 4.

2207.—Smethurst, W., and Wade, J., "Mixing inflammable gas or vapour with air, and utilizing such mixture." Feb. 4.

2334.—Jones, G. H., "Gas-igniter." Feb. 6.

2363.—Ingham, W. P., and Crowe, E., "Gas-fired recuperative kilns." Feb. 8.

2455.—Major, J. L., "Lamps for oil, gas, or vapour, and appliances connected therewith for burning common oils." Feb. 9.

2728.—Abel, C. D., "Gas or oil motor engines." A communication from the Gas-Motoren-Fabrik Deutz. Feb. 11.

2864.—Lee, T. W., "Appliances for use in connection with burners for burning an explosive mixture of gases." Feb. 13.

Increased Storeage for the Brussels Gas-Works.—According to the Brussels correspondent of *Industries*, tenders are shortly to be invited for supplying two gasholders to the Brussels Gas-Works. These holders are each to have a capacity of 35,000 cubic metres, or about 1¼ million cubic feet, and are said to be the largest in Belgium.

The Gas Question at Bideford.—At the meeting of the Bideford Town Council yesterday week, the Mayor (Mr. R. Dymond) reported that a meeting of ratepayers was held on the previous Thursday, at which a resolution was passed approving of the action begun by the Council, and of their efforts to purchase the undertaking of the Gas Company, and requesting them to continue their negotiations upon such terms as may be considered fair and reasonable. The adoption of the report having been moved and seconded, a little discussion ensued, in the course of which Mr. Squire proposed, in order to show the Company that the Council were serious in their negotiations, that a cheque be drawn for £100, and paid to the Company, and if the Council failed to purchase, the money be forfeited. Mr. Braddick, in seconding this proposition, said he desired the Council to go further, and fix the price—say, £9500—which they were prepared to pay for the works. The motion was carried, two members only voting for Mr. Squire's proposition.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

Progress of Gas Consumption in Denmark.

SIR,—You were good enough in a former number of the JOURNAL to notice the extraordinary increase in the business of the Danish Gas Company during the last 10 years, which increase was as follows:—

Lighting gas	105 per cent.
Cooking gas	318 ,,
Motive power gas	540 ,,

We have now before us the accounts for the year ending Dec. 31, 1891; and the following remarkable increases have again taken place during the past year:—

Aalborg	14·3 per cent.
Assens	10·4 ,,
Flensburg (Germany)	12·4 ,,
Odense	17·0 ,,
Randers	22·7 ,,
Veile	16·0 ,,
Viborg	8·2 ,,
Copenhagen (Frederiksberg)	40·0 ,,
Average total	20·0 ,,

We have another town, Elsinore; and this has shown no progress, for the simple fact that, pending negotiations with the town for a renewal of the concession, no efforts have been made to push the consumption. This will now be changed; and, sleepy as the place is, I think we shall be able to galvanize it into "cooking gas" activity when we take it in hand, and it is the fact of stirring a torpid town into activity, that gives us great satisfaction.

When last in England, many of my friends often asked me how we manage to obtain such steadily-maintained good results; and I answered them shortly as follows:—

Devote all your energies to the sale of "cooking gas," by selling it at the lowest possible price, to give you a margin of profit. It is what you have to depend upon for your livelihood in the future.

Fix independent "cooking gas" meters in the kitchens. It is of the utmost importance that the "good house mother" knows exactly what is being used daily or weekly.

Maintain permanent exhibitions of the best apparatus in each of your towns; and give practical exhibitions of gas cookery weekly, and these on a liberal scale. Our demonstration meat bill for one town alone amounted to between £50 and £60 last year. Employ intelligent womenkind as assistants in the exhibition. The ironmonger's assistant young man is of no use.

Hire out good and reliable stoves on easy terms; and make the fixing of these light and easy for the householder, by fixing services *gratis*, right up to the stove itself.

Never lose sight of your stoves, but employ *female* inspectors of good address and a knowledge of gas cookery, who as occasion requires visit houses where gas-stoves are employed, inquiring of the housewife as to its well-doing, and giving practical aid if the stove shows backslidings in the way of refusing to do duty. Women like to be talked to (I mean *sometimes*) by women, and do not like mankind prying about their kitchens. The gas company's inspector of the common or "garden" type is not liked.

To increase the consumption of lighting gas and check the inroads of electricity, and what in small towns is much worse—the demon petroleum, let out on easy terms first-class high-power lamps, such as the Siemens or Schülke. (We have now over 2000 of these lamps out on hire.) Keep one or two inspectors—practical men, not of the collector type—whose sole duty it is to nightly visit shops and other places where the lamps are fixed, and to see that they are maintained in proper working order, and to personally adjust the lamps from time to time according to variation in pressure or illuminating power. The Siemens lamps are very sensitive in this respect.

Great care must be exercised in selecting the right description of lamps to let on hire. Otherwise a great waste of capital will ensue; and the consumer once set against the high-power system, it will be a matter of difficulty to induce him to try it again.

We have now experienced a three years' trial of the system, and have not had a single lamp returned owing to dissatisfaction on the part of the consumer.

In conclusion, gas men must look on their gas-works as a commercial concern, standing on its own base, to cater for the needs of the public, and not as an Act-of-Parliament-concession-bolstered-up concern.

The days when we considered it an act of gracious condescension to supply a consumer are no more. We have now to hunt up business, and induce the consumer to deal with us, and not to go to the rival firm of Messrs. Electro, Aquagas, Kerosine, and Co., who are only too anxious to "catch on."

F. D. MARSHALL.

Danish Gas Company, Copenhagen, Feb. 18, 1892.

Statutory Evidence as to the Quality of Samples of Gas Supplied by the Metropolitan Companies.

SIR,—My attention has quite recently been directed to the circumstance that a letter by Mr. George Livesey, which appeared on the 24th of March last year in the JOURNAL, contains an erroneous statement on a matter of fundamental importance in the administration of the testing clauses of the Gas Act, concerning which any misapprehension is particularly undesirable. I beg accordingly to trouble you with a brief indication of some of the more important facts of the case.

There are twenty-three "testing-places" in the Metropolis, provided with gas-testing apparatus and materials, under the control of the municipal authorities. A "competent and impartial person" is appointed to each testing-place by one or other of these authorities, for the purpose of ascertaining daily the illuminating power, purity, &c., of the gas delivered by the Company at his testing-place, and of making daily reports of the results of his testings. The illuminating power, as reported each day by a Gas Examiner, is the average of from 30 to 40 photometric observations duly corrected for temperature and pressure, &c. These observations extend over at least three hours, but frequently over a considerably longer time.

Various regulations have been laid down by Act of Parliament for the guidance of the Gas Examiners, and further regulations, as well as apparatus and materials to be employed in the testings, mode of manipulation and of carrying out and calculating the necessary corrections for changes of temperature and pressure, are issued from time to time under the authority of the Special Act by the Gas Referees.

Each Gas Company is, moreover, authorized to inspect the books in which the examiners of their gas record the particulars of their observations and calculations. Each Company may also, on demand, be represented by an officer at a testing-place, so as to see whether the gas examiner deviates in any particular from the precise regulations laid down for his guidance. Whenever a Company, on appeal to the Chief Gas Examiner against a gas examiner's report of illuminating power, proves that a reported test was made in a manner distinctly differing in any particular from that laid down by the Act or by the Referees, such test is disallowed as not being a statutory test, and the report of it is quashed. In like manner, a statutory report showing defective gas is quashed on appeal upon proof by the Company that the defect was occasioned by an unavoidable cause or accident.

It will be seen from this brief outline that great pains have been taken to establish a trustworthy and uniform system of testing daily samples of gas as supplied by the Companies. Each of these tests shows simply the average quality of the particular samples of gas which were used by the gas examiner.

The Special Act accordingly lays down, in the most authoritative manner, that each statutory test is to be taken as affording conclusive evidence of the quality of the gas officially tested at a particular place on a particular day. The Gaslight and Coke and other Gas Companies' Acts Amendment Act, 1880, clause 80, is thus worded: "The average of all the testings at any testing-place on each day of the illuminating power of the gas supplied by the Company at such testing-place shall be deemed to represent the illuminating power of such gas on that day at such testing-place." Each Company is liable to a forfeiture if, on any day, the gas supplied by the Company, at any testing-place, is of less illuminating power than it ought to be under the Special Act.

The various proceedings which arise under the testing clauses and forfeiture clauses are conducted in strict obedience to the regulation which fixes what shall be deemed to be the illuminating power of the gas at the testing-place on the day of the test.

Mr. Livesey's letter has reference to the official report of a statutory test of the illuminating power of gas supplied by the South Metropolitan Gas Company. The report was such as is expressly declared by the Act to be final and conclusive; and it proved that the gas was of defective illuminating power to the extent of 7-10ths of a candle—having only 15·3 candles illuminating power instead of 16 candles, as required by the Act. Mr. Livesey declared himself satisfied that there was no defect in the gas; which is tantamount to saying that the gas had an illuminating power of at least 16 candles.

Mr. Livesey then proceeded to urge as a grievance that, in the hearings of appeals, the statutory tests are taken as conclusive evidence of the illuminating power in question. His words are: "No matter what evidence may be produced to show that the gas was up to the standard, if the official tester has taken his tests in the prescribed manner, the Chief Examiner assumes that the official test is correct, and disallows the appeal." In more explicit terms the statement might run thus: When the Gas Examiner has taken his test in the statutory manner, the Chief Gas Examiner deems such test to represent the illuminating power of the gas delivered by the Company at that testing-place on that day, no matter how much he is pressed to do otherwise; and dismisses the appeal against the test. These facts tell their own tale.

ALEX. W. WILLIAMSON.

Feb. 20, 1892.

Smokeless London.

SIR,—For the last year or two gas coke appears to have been a drug in the London market; and I am of opinion that the cause is not far to seek. It is almost impossible to use gas coke for domestic purposes in an ordinary London fire-grate with either comfort or economy; and in its present condition, it may fairly be classed with anthracite as "an invention of the Evil One."

Cannot the gas companies supply a better article, even at an increased price? Those who would prefer the use of coke to coal (and their name is legion) would, if they could obtain a bright, cheerful, and lasting fire from it, be glad to pay any reasonable price for a fuel which would meet the above conditions, and at the same time be *practically smokeless*. Is it not a fact that by destructive distillation in the retorts, the coal is sweated to such an extent that the resultant coke has "the very pith and marrow taken out of it;" and that it is of very little use for burning in an ordinary grate? Gas companies cannot expect to "eat their cake and have it;" and if they insist upon extracting the largest possible amount of gas from the coal, it is impossible that they can at the same time obtain a first-class coke suitable for household purposes. Assuming that they would be content with a yield of about 8000 cubic feet of gas per ton of coal, of a high illuminating power—say 20 candles, instead of 10,000 cubic feet of 16-candle gas, would not the decrease in quantity be fully met by the increase in quality of both gas and coke?

From my point of view, the latter is the more important of the two.

C. A.

London, Feb. 22, 1892.

Newport (Mon.) Gas-Works Benefit Society.—The annual gathering of the members of this Society took place on Monday last week. There were about 150 employees present. Mr. Thomas Canning, Assoc. M. Inst. C. E., Engineer and General Manager of the Newport Gas Company, presided; and Mr. J. Whitfield, the Secretary of the Society, occupied the vice-chair. The report and balance-sheet presented showed that the Society is in a sound condition. Several toasts—among them being "The Benefit Society"—were duly honoured; and a pleasant evening was spent.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Standing Orders complied with: Airdrie and Coatbridge Water Bill; Ashton-under-Lyne, Stalybridge, and Dukinfield District Water Bill; Barrow-in-Furness Corporation Water Bill; Barry and Cadoxton Gas and Water Bill; Birmingham Corporation Water Bill; Blackburn Corporation Bill; Blackpool Improvement Bill; Bournemouth Improvement Bill; Bradford Corporation Water Bill; Bristol Gas Bill; Brynmawr and Abertillery Gas and Water Bill; Cleator Moor Local Board (Gas) Bill; East Grinstead Gas and Water Bill; Exmouth and District Water Bill; Glasgow Corporation Water Bill; Ilkley Local Board Bill; Ipswich Corporation Bill; Kilmarnock Corporation Water Bill; Lanarkshire (Middle Ward) District Water Bill; Leeds Corporation Water Bill; Liverpool United Gas Bill; London County Council (General Powers) Bill; London County Council (Subways) Bill; Middlesbrough Corporation Bill; Mold Water Bill; Newcastle-upon-Tyne Improvement Bill; Newport Corporation Bill; North Shields Water Bill; Ormskirk Gas Bill; Oxford Gas Bill; Pontypool Gas and Water Bill; Pontypridd Water Bill; Rhyl Improvement Bill; Rhymney Valley Gas and Water Bill; St. Pancras Vestry Bill; Southborough Local Board (Gas) Bill; Southend Gas Bill; Stamford Gas Bill; Sunderland and South Shields Water Bill; Swansea Corporation Water Bill; Swinton and Pendlebury Local Board Bill; Tredegar Local Board Water Bill; Uttoxeter Water Bill; Western Valleys (Mon.) Water (Gas Purchase) Bill.

Standing Orders not complied with: Llanbradach District and Aber Valley Water.

Bills presented and read the first time: Ashton-under-Lyne, Stalybridge and Dukinfield District Water Bill; Barrow-in-Furness Corporation Water Bill; Bradford Corporation Water Bill; Glasgow Corporation Water Bill; Ipswich Corporation Bill; Kilmarnock Corporation Water Bill; Llanbradach District and Aber Valley Water Bill; Newport Corporation Bill; Rhymney Valley Gas and Water Bill; Southborough Local Board (Gas) Bill; Swansea Corporation Water Bill; Swinton and Pendlebury Local Board Bill; Tredegar Local Board Water Bill; Uttoxeter Water Bill.

Bills presented, read the first time, and referred to the Examiners: Bristol Gas Bill; Cleator Moor Local Board Gas Bill; Liverpool United Gas Bill; North Shields Water Bill; Oxford Gas Bill; Pontypridd Water Bill; Western Valleys (Mon.) Water (Gas Purchase) Bill.

HOUSE OF COMMONS.

Monday, Feb. 15.

The petitions were presented for the following Bills, which were ordered to be brought in:—

*Airdrie and Coatbridge Water Bill, by Mr. Baird and Mr. Sinclair.
*Barry and Cadoxton Gas and Water Bill, by Mr. A. Williams and Mr. A. Thomas.
Birmingham Corporation Water Bill, by the Right Hon. H. Mathews, Mr. Chamberlain, Mr. H. H. Fowler, Mr. Kenrick, and Mr. Powell-Williams.
Blackburn Corporation Bill, by Mr. Coddington and Mr. Hornby.
Blackpool Improvement Bill, by Sir M. W. Ridley, General Feilden, and Mr. J. Maden.
Bournemouth Improvement Bill, by Sir H. Davey, Mr. Jeffreys, Mr. Pitt-Lewis, and Mr. Young.
*Brynmawr and Abertillery Gas and Water Bill, by Mr. F. Morgan and Mr. Warmington.
*East Grinstead Gas and Water Bill, by Mr. A. Gathorne-Hardy and Colonel Malcolm.
*Exmouth and District Water Bill, by Sir J. Kennaway and Sir S. Northcote.
Ilkley Water Bill, by Mr. Shaw Lefevre and Mr. Barran.
Lanarkshire (Middle Ward District) Water Bill, by Mr. D. Crawford and Mr. Philipps.
Leeds Corporation Bill, by Mr. Jackson, Sir L. Playfair, Mr. H. Gladstone, Mr. G. Balfour, and Mr. Gane.
London County Council (General Powers) Bill, by Sir J. Lubbock, Colonel Hughes, Mr. J. Stuart, Mr. Lawson, and Colonel H. Vincent.
London County Council (Subways) Bill, by Colonel Hughes, Mr. J. Stuart, and Earl Compton.
Middlesbrough Corporation Bill, by Mr. Fell Pease and Mr. I. Wilson.
*Mold Water Bill, by Mr. J. Roberts and Mr. S. Smith.
Newcastle-upon-Tyne Improvement Bill, by Mr. J. Morley and Mr. Craig.
*Ormskirk Gas Bill, by Mr. Forwood and Mr. Curzon.
*Pontypool Gas and Water Bill, by Mr. F. Morgan and Mr. A. Thomas.
*Rhyl District Water Bill, by Mr. West and Mr. J. Roberts.
Rhyl Improvement Commissioners Bill, by Mr. J. Roberts and Mr. S. Smith.
St. Pancras Vestry Bill, by Sir J. Goldsmid and Mr. Lawson.
*Southend Gas, by Mr. Warmington, Mr. Halley Stewart, and Mr. Rentoul.
*Stamford Gas Bill, by Lord Burghley and Mr. Finch.
*Sunderland and South Shields Water Bill, by Mr. Storey and Mr. Gourley.

On Tuesday and Wednesday all the above-named Bills were presented and read the first time; those marked * being referred to the Examiners, and the remainder being ordered for second reading.

Petitions against the following Bills were presented during last week:—

Birmingham Corporation Water Bill, from the Conservators of the Wye Fishery District.
Pontypool Gas and Water Bill, from John Williams (for the insertion of a clause).
Southend Gas, from the Southend Local Board.

LEGAL INTELLIGENCE.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Wednesday, Feb. 17.

(*Before Lords Justices* LINDLEY *and* KAY.)

Andrew and Co. v. Crossley and Co.—Crossley and Co. v. Andrew and Co.

This was an appeal from a decision of Mr. Justice Chitty in certain actions brought by the above-named parties (the well-known gas-engine makers), in which important questions were raised as to the procedure under the Patents Acts. The points raised were fully set out in the JOURNAL when the matter was before his Lordship early last month (see *ante*, p. 116); the principal one being as to the operation of an order, made under section 18 of the Act of 1883, giving leave to amend the specification of a patent. It was held that the amended specification was admissible, on the ground that the proceedings for amendment terminated with the leave to amend. This was a decision in favour of Messrs. Crossley and Co.; and against it Messrs. Andrew and Co. appealed.

Mr. HOPKINSON, Q.C., and Mr. J. C. GRAHAM appeared for the appellants; the ATTORNEY-GENERAL (Sir R. E. Webster, Q.C., M.P.) and Mr. W. N. LAWSON represented the respondents, but were not called upon.

Lord Justice LINDLEY said the appeal was from a decision which was in effect that the action for the infringement of the patent under the amended specification could not be maintained. The form of the question stated for the decision of Mr. Justice Chitty was not quite accurate. The action being for the infringement of the specification as amended, it was difficult to see how that specification could be excluded. But the real question was, whether the action could be maintained. The action was brought upon a specification which the statement of claim alleged to have been duly amended; and it was commenced before the specification had been actually amended. What was the difficulty? Before the writ was issued, the patentees had applied for, and had obtained (on June 9, 1890) leave to amend their specification, upon the condition that they should not bring any action for any infringement committed before Jan. 1, 1884. From the evidence, his Lordship understood that this condition was then and there assented to by the patentees. The amendment was then made in every sense except that the document was not actually altered. The terms of the proposed amendment had been stated by the patentees; its exact terms were accurately known by the Patent Office; and nothing remained to be done but to enter the alteration on the register. This was the position of affairs when the action was begun. What was the objection to the action? Reliance was placed upon a minute criticism of sub-section 10 of section 18 of the Act. No doubt, as Mr. Hopkinson had said, the patent was one and indivisible, and therefore an action was pending for the infringement of the patent. But, looking at the previous provisions of section 18, his Lordship could not see how any of them applied to such a case as the present, except sub-section 9. He thought the obvious meaning of sub-section 10 was this: When you are applying for leave to amend your specification, and have not got it, you shall not bring any action for infringement of your patent. But sub-section 10 did not apply when leave to amend had been actually obtained. There was nothing in the Act requiring the patentee to give a written acceptance of the condition imposed. After the leave to amend had been granted, nothing more remained to be done by the patentees. The only possible difficulty was in the suggestion that the patentees were in some way infringing section 19. But in the present case the plaintiffs did not require the leave of the Court to amend, for they had leave already. The whole argument turned on this—it asked the Court to construe sub-section 10 as applying to an action brought for the infringement of a patent the specification of which had been amended, instead of an action for the infringement of a patent the specification of which had not been amended. The appeal must be dismissed.

Lord Justice KAY entirely agreed. He said that in his opinion the action was properly brought, and everything necessary to be done by the patentees for the amendment of the specification had been previously done. Nothing was said in section 18 about the making of the actual amendment. If leave to amend had been applied for, and had been granted subject to a condition, and the condition had been assented to by the applicant before the action was begun, there was nothing in section 18 which prevented an action for infringement being then commenced on the amended specification. Was there a single thing which was required to be done by section 18 which was left undone when this action was brought? Not a single one. Sub-section 10 could not have the least reference to a case like the present, in which everything which section 18 contemplated had been completed before the action was brought. The argument had proceeded upon an entire misapprehension of section 18. There was nothing in the Act which required a written acceptance of the condition imposed by the Comptroller. All that remained to be done was the registration of the amendment at the Patent Office, as required by section 23. The patentees had nothing to do with that. It was the duty of the Patent Office to make the registration. Section 19 provided for a perfectly different state of things. Its meaning was this: You cannot bring an action upon a patent, and then obtain an amendment of the specification without the leave of the Court. To such a case, section 18 had no application. But there was nothing in section 18 which said an action could not be brought upon an amended specification when leave to

amend it had been obtained, and everything which had to be done by the patentee to procure the amendment had been done, and nothing remained to be done but by the Patent Office. It had been stated that it was the practice of the Patent Office, after leave to amend a specification had been given, and before the amendment had been actually made on the register, to issue certified copies of the original unamended specification, without any note upon them of the fact that leave to amend had been given. There was nothing in the Act which required the Patent Office to do that. If this was the practice of the office, it was a very bad one; and the sooner it was altered the better. But this practice could not alter the Act, or make the action wrongly begun. In his Lordship's opinion it was rightly begun; and he did not see that any evil could result from this construction of the Act.

The appeal was therefore dismissed.

COUNTY OF LONDON ASSESSMENT SESSIONS.

Sessions House, Clerkenwell, E.C.—Thursday, Feb. 11.

(*Before Sir* P. H. EDLIN, Q.C., *Chairman, and a Bench of Magistrates.*)

Judgment in The Gaslight and Coke Company's Assessment Appeals. Explanatory Note by the Chairman.

The following note, explanatory of the judgment delivered in the above-named appeals, given in the JOURNAL last week (p. 299), was issued by Sir Peter Edlin to-day:—

It will doubtless have been understood, from what was said after judgment had been delivered at the sitting on Monday last, that, in ascribing a *separate* rateable value of £250,000 to the stations and indirectly-productive works, we had adopted Mr. Ryde's separate valuation of those works, and that we did so in complete accordance with the written particulars thereof appended to his evidence. Now, it will have been observed that that valuation was arrived at *after* allowance made for rates; and, therefore, it will not be subject to any further deduction. But with regard to the other portion of the works, the assigned rateable value of which we said would be subject to certain deductions in respect of rates, the intended meaning would have been more precisely expressed had we said *corrections*. We differed materially from Mr. Ryde, as well as from the other professional witnesses; and it may be desirable that, having made this emendation, we should add a few words in order to remove any possible ambiguity. The "landlord's share" of this portion (I quote the words of the judgment), or the specified rateable value of it—viz., £370,500—would, of course, be irrespective of rates, which, in assessing property of this description, have to be deducted before we reach the letable or rateable value; and in the estimate specified, they had been taken generally at 5s. 2d. in the pound, and deducted accordingly. The same amount—viz., £155,864—was deducted for rates by *each* of the valuers examined; that sum having been the amount actually paid in the account year. But upon the now altered total assessment, we calculate that the Company would be entitled to a somewhat larger deduction; and the difference hence arising would necessitate the "correction" referred to, and would, of course, have to be apportioned, not only according to the value allocated, but, as I expressed it in the judgment, according to the poundage actually levied in each parish respectively. The necessary corrections for this purpose will require the aid of a skilled accountant.

Friday, Feb. 19.

On resuming the proceedings to-day,

Mr. LITTLER said that he desired to present certain matters to the Court. A "substituted" document had been sent to the parties, altering the views which were expressed by the Court in the first instance.

The CHAIRMAN said he could hardly concede that; and must at once meet it with a direct negative. It was not a "substituted" judgment, but an explanation of what might be ambiguous in the judgment as delivered by the Court. It was sent in order to remove any ambiguity. If the judgment was looked at, and compared with the synoptical table, they would find that there was no substitution. He complained that the matter was brought on without notice, and he consequently had not his papers with him—the questions having been postponed by general consent till the following Friday. If, however, there was any preliminary point to which Mr. Littler desired to call his attention, he would be happy to consider it; but when he made use of the expression "substituted" judgment, he at once met it with a direct negative. The emendation or correction, as it might be called, of an ambiguous word, was not necessarily inconsistent. But, on the contrary, it was quite consistent with the judgment originally delivered; and Mr. Littler had himself told him that his clients thought there was an ambiguity which had better be removed.

Mr. LITTLER said that the only ambiguity in his view was that with regard to the unproductive mains.

The SOLICITOR-GENERAL said he should very much like to know what it was that Mr. Littler proposed to do, or what motion he desired to make. They had been brought to the Court by a letter from the Solicitors to The Gaslight and Coke Company; and he hoped that his Lordship would allow Mr. Littler to mention the matter, so that he might see whether or not it was a motion he was going to make.

The CHAIRMAN said that it was agreed that he might be consulted *in camerâ* in regard to any question which might arise; and in that consultation the substance of the explanatory note was most clearly stated by him. If, however, his judgment had been carefully read in the first instance as it was delivered in Court, in conjunction with the synoptical table, the explanatory note would not have been necessary; but to clear up any ambiguity, he added that note, because he understood that Mr. Littler's clients thought that the word "deduction" or "reduction" might have been misapprehended.

Mr. LITTLER said that, with regard to the main question of the £370,000, he had no authority from his clients to assent to any such alteration as that.

The CHAIRMAN: How do you mean "consent to any such alteration?" The Court has to deliver its judgment.

Mr. LITTLER: Then I ask that the judgment as delivered may stand.

The CHAIRMAN: The Court has to deliver its judgment; and, if it is ambiguous, it is for the Court to put the proper construction upon what it intended.

Mr. LITTLER said that, must be done in the first place in open Court by the Court; but he said it was not ambiguous in the slightest degree.

The CHAIRMAN: I hope it is not now.

Mr. LITTLER said that one parish had acted upon the original judgment in the sense in which he understood it, and had sent them in particulars on that basis.

The CHAIRMAN said that, if the parish in question acted upon its view, and because of ambiguity it took a view contrary to that which the Court intended, it was for the Court to put the construction that it intended upon its judgment.

Mr. LITTLER said he was sure his Lordship would appreciate the importance of this matter. It made a difference of £130,000 a year to The Gaslight and Coke Company; and if the correction stood, it would have the effect that the Company would be actually paying a sixtieth of the whole rates of London.

The SOLICITOR-GENERAL: Why not?

The CHAIRMAN said that the Court had had to deal with very wide differences, involving upon one point of view a positive liability to rates exceeding the amount which was agreed upon of £150,000 a year. The Court had had to deal with the materials before it, with a most anxious desire to do justice between the parties; and it had come to the conclusion which was very clearly expressed in the printed copy of the judgment. He admitted that the expression "subject to deduction for rates," was somewhat ambiguous, but they must observe that if they increased the rateable value of the appellants' property, why then they would be entitled to a larger deduction for rates than was included in the sum which was, by universal consent, agreed to by all sides. Therefore he was perfectly correct in saying that, in arriving at that sum, they must not overlook the fact that the appellants would be entitled to a larger reduction than that—subject therefore to the reduction consequent upon the finding of that sum.

Mr. LITTLER protested that they had come to any such conclusion; and he repeated that he must respectfully ask, on behalf of his clients, that the judgment should stand.

The CHAIRMAN: How can it stand?

Mr. LITTLER: Stand as originally delivered in open Court.

The CHAIRMAN: Certainly; but subject to an interpretation upon it which would be contrary to the interpretation which the Court intended, and to which we all agreed.

Mr. POLAND said that there was no judgment until his Lordship had decided what was the gross rateable value in each parish.

The CHAIRMAN: No, of course there is not.

Mr. LITTLER said that it now worked out pretty nearly to the same effect as if the Company had not appealed.

The CHAIRMAN said he could not help the effect. Mr. Littler would have been the first to blame him if he had framed his judgment upon the hypothesis, and anticipated the conclusion that the sum of £155,864 would be all the deduction necessary for rates. He did not do so. He showed clearly that the Company would be entitled to a larger deduction for rates; and the expression should have been the "correction" of the amount, and not the expression used, which he quite agreed might have led people to suppose that the £155,000 had not been already deducted. Now they had the explanation.

Mr. LITTLER said that of necessity the amount would be larger. It would have been much better if it had not been mentioned in the judgment at all.

The CHAIRMAN said he must be permitted to frame his own judgment, and to express it in such words as he thought would be necessary and requisite for expressing the opinion of the Court.

Mr. LITTLER said that it seemed to him that "correction" was an entirely different word from "deduction."

The CHAIRMAN said he could not put it clearer than he had. How could they deduct the proper amount for rates until they knew what were the rates in the several parishes—130 parishes in all. In some they were as much as 6s., and in others less than 5s.; and the deduction for rates must necessarily be, as he put it, according to the poundage in different parishes.

Mr. LITTLER remarked that all he could say was that they would have the satisfaction of going all through the figures again with the supplemental rate—that was all.

The SOLICITOR-GENERAL said that not only was he not aware that certain figures had been sent to the appellants by one of the parishes, based upon an interpretation similar to Mr. Littler's, but until late on the previous night he was not aware that his Lordship had given any explanatory memorandum. He had read the judgment as originally delivered by the Court, and carefully considered it; and in his belief that judgment, when carefully examined, sufficiently established the conclusion at which his Lordship had arrived, and at which he understood his Lordship to arrive, and with which he (the Solicitor-General) was entirely satisfied.

Mr. CASTLE called attention to the printed reports of the proceedings, and contended that they did not bear the construction which his Lordship put upon them.

The CHAIRMAN said he differed from Mr. Castle entirely. If the matter were candidly considered in conjunction with the appellants. own figures, it would be impossible to come to any other conclusion; and the fact that the stations and unproductive portion of the property had been separately assessed, clearly showed that there must have been a deduction for rates in respect to that amount. Otherwise they would have to specify a different figure with regard to that portion of the property.

Mr. CASTLE said that, if his Lordship remembered, the reason given why the apportionment should take place before the rates were deducted, was because there were different rates in each parish. Therefore as to the £370,000 which they had to distribute, they must first agree as to what portion of the £155,000 of rates was added before they distributed it at all. They could not distribute the £370,000; but they must distribute some other sum which must be the £370,000 *plus* an aliquot proportion of the £155,000.

The CHAIRMAN said that would be subject to deduction before it was distributed; and that deduction would be the difference between the rate in respect of the present assessment and the amount of rates

in each parish—the difference to be ascertained by comparing what was the former assessment and what was the present assessment, and making a larger deduction for rates accordingly and according to the specific rate in each parish.

Mr. CASTLE: You cannot distribute it in that way.

The CHAIRMAN: Oh, yes, we can.

Mr. CASTLE said that in some parishes the rates were 5s., and in others 4s.; so that they could not apply it in that direction. Therefore the £370,000 must have added to it some further sum, and that must be the difference for the wholé of the rates.

The CHAIRMAN said that Mr. Castle was altogether in error in saying that it could not be done. It might be a difficult calculation; but with the aid of an accountant it could be made, and made upon the data which were furnished. If they considered that the receipts in each parish had to be compared with the total gross receipts of the Company, then there would come a deduction in respect of what might be called the general expenses—namely, the unproductive works. Then there was the residue or remainder; and that remainder had to be distributed in a like ratio. When they ascertained in the account year (which was a different year from that upon which the calculation was first based) what the receipts were in each parish, they would then have to consider what proportion they bore to the general receipts after these receipts had been subjected to the deduction spoken of. Then, when they got that ratio, they would have to apply it to the remaining sum for distribution.

Mr. DANCKWERTS, following on the same side as Mr. Littler and Mr. Castle, said that it was a serious matter for his clients; and therefore he desired to say something in addition to what his leaders had stated. It was obvious, if they looked at the synoptical table, that that was founded upon a different basis altogether as regards the respondents' witnesses and as regards those who appeared for the appellants. The respondents' witnesses had all of them added £200,000 odd for the increased price of gas.

The CHAIRMAN: No, not all of them.

Mr. DANCKWERTS: All of them, without exception.

The CHAIRMAN: Not in respect to those figures which we have taken for our assessment.

Mr. DANCKWERTS: Every man of them has done so. Every man has added 3d. for the increased price of gas, and that accounts for £200,000 of the difference between them.

The SOLICITOR-GENERAL: Mr. Jones added something in respect of that.

Mr. DANCKWERTS: I beg your pardon; you are utterly mistaken.

The CHAIRMAN: I think not, Mr. Danckwerts.

Mr. DANCKWERTS said it was obvious that it was only in those cases that there could be a deduction by way of correction where the rateable value had been increased; and his Lordship would find that all the witnesses who had decreased the rateable value as compared with the account year had added a correction by way of rates.

The CHAIRMAN said he quite followed that. The three valuers called on behalf of the appellants put the sum at which they alleged the property should be valued at a less amount than that at which it stood at the last quinquennium. Then necessarily they had to add an amount for rates, because they would not be entitled to so large a reduction as they had formerly; but the others, if they were valuers putting up the assessment, had, of course, to take that into account.

Mr. DANCKWERTS: Are we to understand, then, that the Court did intend to put up the assessment because of the 3d.? That is the point.

The CHAIRMAN: I am much obliged to you for putting a categorical question. I answer it by saying that I leave you to consider the judgment, and to answer the question according to the judgment.

Mr. DANCKWERTS said his Lordship would pardon him, but this was an important matter. It had occupied the Court for seventeen days during more than six months, and enormous costs had been incurred. There had been talks of supplemental lists; and unless they understood that the Court had given due weight to that addition of 3d. to the price of gas, it might be that they would have to come again this year or next year, and fight the whole matter over again before the Court.

The CHAIRMAN: You want an encouraging word from me to induce you to appeal again.

Mr. DANCKWERTS said they merely wanted something from the Court which should be equivalent to finality, and put a stop to this enormous expense. He would like an answer to the question he had put. The next point he had to make was that, on the sixteenth day of the hearing, the Court called them all solemnly together and put certain questions to them, and made certain bargains with them, which the appellants understood and which they accepted only in the way in which they understood it. The way in which they understood that bargain was this——

The SOLICITOR-GENERAL: A bargain!

Mr. DANCKWERTS: Yes, and with you too, Mr. Solicitor.

The SOLICITOR-GENERAL: My Lord, I never made a bargain with the Court in my life.

Mr. DANCKWERTS said it was agreed that the Court should deliver judgment upon a certain basis. He called that a bargain. It was plain Saxon-English, and it was the right word. That bargain was this—that the Court should name a sum for the total of the directly-productive works; that this total should be allocated among the parishes; and that the rates in each parish should be deducted therefrom, according to what they really were in each parish.

The CHAIRMAN said Mr. Danckwerts was putting an interpretation upon what he said entirely foreign to his intention; and, if it were carefully considered, an interpretation that would be absolutely inconsistent with a judicial dealing with the case. He could not fix the rateable value in either of the parishes until he knew what the rates were in the account year. He had pointed out that the Company were entitled to a deduction for rates. The rates were not deducted in ordinary cases. In the case of house property, they were left to be paid by the tenant after the rateable value was fixed; but they had in this case to consider what would be the charge upon the Company for the rates they would have to pay. This introduced necessarily some little complication into the statement of the figures, and into the accounts. He could not undertake to ascertain from each parish what was the amount of its rates in the account year, and then work out the necessary sums for the purpose of showing what would be the specific rateable value in each parish, and what would be the total when they came to be added together. How could he do that?

Mr. DANCKWERTS said that to his mind it did not present any difficulties, and also that was the way in which they understood the arrangement that was made on the sixteenth day.

The CHAIRMAN remarked that if he said anything which might have produced a misapprehension, he apologized. They made no bargain, and he could not accept that word.

Mr. DANCKWERTS said that then he failed to see what conceivable object could have been accomplished by calling the parties together.

The CHAIRMAN said the object of the interview was that he wished to find what was the proper proportion of division for the gross receipts. He found a general accord with the principle.

Mr. DANCKWERTS said that so far as one man could know the mind of another, he knew the respondents understood the matter in the way in which the appellants understood it. He did not say that this was the case with all the respondents; but it was so with those with whom they had communicated. At the outset, an agreement was made that his Lordship, in the first instance, should determine the value of the whole; that this should be the judgment of the Court; that the parties should subsequently apportion it among the parishes in the usual way; and that if any difficulties arose they should come before the Court. Under the statute, his Lordship was bound to deliver judgment in open Court; that judgment was delivered in open Court on the seventeenth day; and the appellants claimed by that, and could not accept any subsequent modification by private circular.

The CHAIRMAN said that, if the parties were represented, he would now read his judgment.

Mr. DANCKWERTS said that the Court was not composed as it was on the day that the judgment was delivered; they had the judgment of the Court on the seventeenth day, and they could not accept anything else.

The CHAIRMAN: You have the judgment as delivered, with the explanatory note.

Mr. DANCKWERTS: I cannot accept that note. It makes a difference to us of an enormous sum. We cannot accept anything except the judgment of the Court as it was constituted on the seventeenth day.

The SOLICITOR-GENERAL applied for the costs of the day's proceedings against the appellants.

The CHAIRMAN said he did not think he should make any such order at present. The question of costs would be one that they would have to consider, and he was much exercised as to what the Court would do in the matter. The appellants, now that they had had an opportunity of studying the judgment, were not so well satisfied with it as they appeared to be when it was delivered, and they had set forth certain reasons, and they would have him think that the judgment was not open to the ambiguity which he admitted that it was. But he had dealt with that; and he thought he had succeeded conclusively in showing that, when the facts came to be looked at according to their own synoptical table, a frank and candid mind construing the judgment would have seen that it bore no other interpretation than that which it must bear with the explanatory note which he had added. With regard to the costs, let both sides understand that the Court had to look at the figures that were presented on behalf of the respondents as well as on behalf of the appellants. He would instance one case which he was very sorry to observe—the parish of Islington. In that parish there was a claim, in rough figures, of £45,000 rateable value; and the appellants insisted that they ought to be rated at £12,000 rateable and £14,000 gross value. Look at the wide difference which the Court had to consider, and at the embarrassment caused by those widely conflicting opinions, and the difficulty of the task imposed upon it. The Court, however, did not shrink from the task; and he personally devoted hours and days, when he had not been sitting in that Court, to the consideration of the facts in the case. If he had gone wrong, all he could say was that he deeply regretted it; but he had applied his mind most conscientiously to the matter, and he abided by, and should abide by, the judgment as it had been explained by himself.

Electric Lighting for Dublin.—The electric lighting undertaking of the Dublin Corporation has now progressed very nearly to completion. The main building is in Fleet Street, and will be finished in about a fortnight. It consists of engine-rooms and offices, testing-rooms, and a storeage room, and will shelter three 300-horse power engines for private lighting, and three 60-horse power engines for public lighting. Two of the private lighting engines can work 5000 incandescent lamps of 16-candle power; and there will be one spare engine in case of accidents or emergencies. The public lighting engines can supply 120 arc lamps, with one engine in reserve. The foundations are ready for the engines and dynamos; and the wires are laid in the principal streets in the portion of the city which the Corporation has selected to be first lighted. The Electrical Engineering Company of Ireland are carrying out the work; and Messrs. Hammond and Co., of London, are supplying the electrical appliances.

The Gas Question at Eccles.—On Monday last week, a special meeting of the Eccles Local Board was held to consider the petition prepared by the Board's Parliamentary Agent for presentation to Parliament against the Swinton Gas Bill. The petition contained a general clause declaring that the promotion of the Bill would injuriously affect the interests of the Board's district, and requesting the alteration of various clauses, so that (1) Swinton should not have the power to impose a differential rate on gas consumers in the Eccles district; (2) that the illuminating power of the gas to be supplied by Swinton should be 18 instead of 14 candles; (3) that the Eccles Local Board should have the control of their lamplighters; and (4) that a clause be inserted in the Bill enabling the whole of the out-districts affected by the clause in the Salford Act to form a joint authority, or that section 48 of the Bill be so altered as to enable Eccles to purchase only such portion of the gas undertaking as is situate within its own districts, or those portions of the out-districts—Irlam, Cadishead, and South Barton—which are supplied by the gas-mains running through Eccles. The petition was approved; there being only one dissentient.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held on Wednesday last, at the Bridge House Hotel, London Bridge—Mr. GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Frank Bush) having read the notice convening the meeting, and also the minutes of the previous meeting, the report of the Directors, with the accounts for the six months ending Dec. 31 last (given in the JOURNAL for the 9th inst.), was taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, observed that several questions were raised in the report upon which, he thought, an explanation was due to the shareholders. Beginning with the first paragraph, reference was made to the coke, on which the Directors stated that there had been a very serious falling off in the receipts—a falling off amounting to £32,500 in the half year. He thought the proprietors were entitled to know how and why this had happened. He might say that, as to quantity, coke was not produced at all uniformly throughout the year. They made about thrice as much in the three or four winter months as in the summer months. In the winter the supply exceeded the demand; while in the summer the demand exceeded the supply. Consequently, they were obliged to store a large quantity every winter, in order to meet the summer demand, and thus avoid disappointing their customers as well as prevent a great fluctuation in price. In 1890 the stock which had accumulated in the previous winter was not sufficient, and they ran out of coke. Its price therefore rose very materially; and the cement manufacturers, who had been obtaining their coke by contract at about 6d. per cwt., had to pay as much as 9d. per cwt. for contracts made that year. This was a very serious matter for them, because coke was the heaviest item of their expenditure; and the result had been that the cement trade had fallen to pieces very much indeed. It was, in fact, now in a very unprosperous condition, partly owing, he presumed, to the great advance in the price of coke. The increase in the cost of coal, therefore, which was reflected in coke, had acted detrimentally to the cement trade, which was a most important one in this country; and no doubt it had been detrimental also to other trades. Seeing that they had not enough stock in the summer of 1890, they accumulated a large quantity in the succeeding winter; but in the summer of 1891 they were quite unable to sell any appreciable amount of it. Prices fell off very materially; and the cement contracts had to be made at very much like the old figure. He thought this was a sufficient explanation of the great falling off in the receipts from coke. The Directors could not get rid of their stock, so in the fall of last year they determined that they would not allow it to accumulate any further; and it would be found, in the statement referring to the residual products, that in the six months covered by the period under review, they scarcely increased their stock of coke at all. They reduced the price in order to sell all they made; and he contended that in so doing they had acted wisely and of necessity. It would have been the extreme of folly to have kept up the price, and so increased the stock: for this would have made their difficulties all the greater. The JOURNAL OF GAS LIGHTING and *Money* had referred to a sentence in the paragraph from which he had quoted, in which the Directors stated that the reduced price of coke might be expected to benefit gas undertakings by helping to bring down the price of coal. He desired to make it perfectly clear that they had not reduced the price of coke for the purpose of lowering the price of coal. It would not only have been folly, but it would also have been wrong, to waste their money in any such attempt. It had, however, occurred to them, seeing that coke had returned to its original value, and that coal still remained very high, that, if the former were sold at its present low price, it must, to some extent, at any rate, affect the price of coal. They had therefore said that it might not be altogether such a great disadvantage to them that coke was so cheap; and this accounted for the following sentence in their report: "Coke being now a far cheaper fuel than coal, the sale, at low prices, of the large quantities for disposal all over the country may be expected to benefit gas undertakings by helping to bring down the price of coal." He repeated, however, that the Directors had reduced the price of coke because they could not help themselves. The price of coal was, as the proprietors were all aware, a most serious matter to them. When he told them that last year 52 per cent. of the Company's total expenditure was upon coal, they would see what a serious matter was a rise in its price. Coal was a little cheaper now; but seeing that only two months ago it was 50 per cent. more, free on board in the Tyne, than it was two or three years previously, it was plain that its high price must very seriously affect them; and the drop in coke had also affected them very seriously also. With these items, however, he had done with all that was unsatisfactory. In all other particulars, what they had to say to the proprietors was, in the opinion of the Directors, of a most satisfactory character. He found that the increase of their business was going on at a greater rate than before. For instance, in the five years from 1881 to 1886 they increased 25 per cent.; while in the five years from 1886 to 1891 they increased 29 per cent. Altogether, since 1880, the increase in their business amounted to nearly 300,000 tons of coal a year. In 1880 they used 387,000 tons; and in 1891 they used 682,000 tons. With regard to the increase in the consumption of gas, comparing last half year with the corresponding period of the previous year, there was practically no increase—at any rate, it was less than 1 per cent.; but then they were comparing a mild season with a totally exceptional one. The half year ended December, 1890, was such as they had never known—at any rate, for the last 30 or 40 years; and to obtain a fair comparison, they must go back some time. He could not compare the past half year with the December half of 1889, because then there was a disturbing influence. At that time they were in the midst of the strike, which affected their consumption; and therefore it was necessary to go back to 1888. On doing so he found that, comparing the December half of 1891 with the same period of 1888, the increase in the consumption had been 13¼ per cent., or rather more than 4½ per cent. per annum. He thought this was satisfactory. The next item in the report contained a reference to the Company's officers and foremen; and he was bound to say that, as had always been the case, they were devoted to the interests of the undertaking. The proprietors were very much indebted to them for the earnest devotion with which they served the Company; and he thought he might say that the good feeling which existed between the Directors and the officers was thoroughly reciprocal. As he had given the meeting the proportion of the expenditure upon coal, he might say that salaries represented about 5 per cent. of the Company's total expenditure. In connection with the officers, they had within the last half year started a superannuation or pension fund—the officers and the Company contributing an equal amount—to provide a retiring allowance on the officers attaining a certain age, without their having to come before the Board, and then having each case dealt with on its merits. He believed that this would work to the satisfaction of the officers as well as to that of the Directors. He next came to a very important matter—the question of the workmen. The Directors said in their report: "Of the workmen of all classes, it can truly be said of the great majority that never has the work been done better, or in a more cheerful spirit, particularly by the stokers, than during the week of fog at Christmas." He might say, in reference to that week, that the Company had considerable difficulty in supplying their consumers; but their worst day was on the Tuesday. In consequence of the thorough manner in which all their people put their shoulders to the wheel, by the Wednesday and Thursday they were gaining on the fog; and their Engineer had informed them that, if the fog had lasted eight days, they would have been quite masters of it. Walking through the retort-house with their foreman on the Wednesday, he asked him how the men were doing. Their foreman was not one to say that the men were doing well if they were not; but he replied that they were doing as well as could be wished. He (the Chairman) then asked whether the men were working the retorts a little harder; and the reply was: "Yes, and without being asked to do so. They are putting an extra quantity of coal into the retorts without the foremen asking them to do it." Now, that was a return to the old state of things which used to exist between employers and workmen; and the men had acted as stated without any expectation of getting extra pay, and, indeed, without getting it, for when there was too much gas the work was eased somewhat, and in times of pressure it was expected that the servants of the Company, from the Directors downwards, would put in some extra exertion, as was done during the fog in question. The Directors considered this the most important question affecting the interests of the Company—that their men should work on terms satisfactory to themselves and to their employers, and that they should work in a cheerful, happy, contented spirit. It was the object of the Directors to do everything that was fair and just—for it was justice, and not charity, that workpeople wanted—to promote this state of feeling; and he thought they were fairly succeeding. For workmen's wages they paid last year something like £300,000, which was 35 per cent. of their total expenditure; so that any abnormal increase in wages or reduction of work would, as the proprietors could see, very seriously affect them. With reference to the question of labour and capital, he held in his hand the annual report of the Labour Association for Promoting Co-operative Production. This was an Association of working men; and in their report he found this sentence: "Already, in some industries, and before long in others, it appears likely that organized labour and organized capital will stand face to face in a position alternating between that of armed peace and open war. But, like two hostile though neighbouring nations, each is essential to the welfare of the other; and the question arises, with ever-growing importance, "How will their interests best be harmonized?" He thought this was a very pregnant sentence; and it expressed what was very much the truth—that they were approaching, if they had not arrived at it in many cases, a state of armed peace or open war between capital and labour. What they had to do was to harmonize these two apparently conflicting interests; and he felt that in their own case they had found the system of profit-sharing which they had adopted had tended materially in this direction. At any rate, they were anxious to make their workmen feel that their interests were bound up with those of the Company; and it seemed to him that the way in which their employees did their work was tolerable evidence that they were responding in a right and proper spirit to the efforts which were being made. The proprietors would probably have noticed during the past week the strike of the coal porters. A statement was made that the Union men working at the South Metropolitan Company's wharves had refused to unload the barges. They had been very much surprised at this; and the Secretary wrote to the Editor of the paper a letter on the subject, which, with the usual fairness of the press to the Company, was inserted. The Secretary stated that there were two mistakes in the report. The first was that the Directors were not aware that any members of the Coal Porters' Union were employed by the Company; and, in the second place, that no man had refused to work at any of their stations. The Coal Porters' Union struck on two occasions without giving the Company any notice at all. In the dock strike, all the coal porters stopped work in sympathy with the dockers. There was no grievance or complaint on the part of the coal porters themselves; but all the work of the Company at their wharves was stopped in the strike of August, 1889. Then, in the stokers' strike in December of last year, the coal porters turned out in the same way. Mr. Michael Henry, their Secretary, said to him (the Chairman): "Unless you give way to your stokers, not an ounce of coal shall be received into your works from to-morrow." And the coal porters came out again without notice. The Company then got free from this state of things; and they intended to keep free. The result had been that, while other companies had recently had their coal supplies partially stopped, the South Metropolitan Company had gone on without a hitch. The proprietors might have noticed a case of *Higgins v. Ward*, which had been recently reported in the papers.* Ward, the Assistant Secretary of the Gas Workers' Union, made a charge against one of the Company's men. According to the evidence, Ward said about Higgins, who was employed at the East Greenwich works, that he "would stand about and rob any hard-working man of his week's wages, or his

* See *ante*, p. 117.

watch and chain if he were lucky enough to have one; and he knew the cells in Strangeways Gaol better than the retorts in gas-works. He had often been convicted; and on one occasion, when he had been taken into custody, upwards of 40 pawntickets were found on him relating to stolen watches and chains which he could not account for." It had been stated that the Directors had asked Higgins to explain this matter; but this was not the case. The fact was that the man came to them, and said that it was a very serious state of things for him; that he lived in the immediate neighbourhood where the statement was made; and that he had since then been pointed at as the Manchester thief. He (the Chairman) told Higgins they would do all they could to protect him; that he might go to the Company's Solicitor; and that an action for slander should be proceeded with if he was prepared to go on with it. This Higgins had done. Workmen were often charged with want of pluck in such matters; but he had not found this to be the case where they were properly supported. The Directors paid the cost of the action, with the result that the Judge (Mr. Justice Denman) stated that "he could not say that this was not a very serious slander, as systematic dishonesty of a very low character was charged against the plaintiff." The defendant would not apologize; and a verdict of £200 was given against him. But here the law was in fault. The man snapped his fingers at the verdict, and said that neither the Company nor anyone connected with them should have a brass farthing out of him. Inquiries had been made about him; and it had been stated that the whole of his goods were not worth a pound. A poor man could therefore be slandered, as Higgins had been, and there was no remedy. However, the action which had been taken had to some extent stopped Mr. Ward from making his speeches. This same man last summer said to Mr. Tysoe, the Manager of the Company's East Greenwich works: "We will have all your Company's men in the Union again before next winter; and then we shall have another strike," which, of course, was an empty threat; but after this, who could blame the Directors for saying that they would not employ men belonging to the Union? They refused to do so both in their own interests, and in that of the workmen themselves. Turning to the accounts, the Chairman said that the item of "repair, maintenance, and renewal of mains and service-pipes" was high as compared with what it was last year. Last summer they were laying or relaying a large quantity of old mains; and as they could not charge this expenditure to capital, it had to come into the revenue account. This had swollen the item; and another cause for swelling it was that a considerable length of large main had been found to be leaky. It was laid in a road that was not secure, and a settlement had taken place, causing very heavy expense—amounting to about £20 a week for some months—in searching for leaks. This and the relaying of old mains accounted to a great extent for the increase in the item of repairs and renewals. With reference to stoves and meters, the question had been raised as to what the Directors did in the matter. The answer was that they treated them both alike. When an old meter was worn out, they bought a new one, and paid for it out of revenue, so as to keep their capital intact; and when an old stove was worn out, they also bought a new one, and paid for it out of revenue, so as to keep their capital intact. Thus they maintained their meters and stoves at their original capital value. They did not write off anything for depreciation; but they did what was the same thing—they restored out of revenue all the wear and tear. The next point in the report was an important one, relating to capital; and here he thought the shareholders had a right to ask for full information. The Directors were year by year asking the proprietors and the public for more capital. During the last ten years they had raised something over £900,000 of capital; and the shareholders might well ask what had become of it. Whether or not they had expended the capital advantageously was the question that concerned the proprietors and the public. They would want to raise additional capital; and if they could convince the shareholders and the public that the capital so raised was being wisely and advantageously expended, they would find no difficulty in obtaining it in the future as they had done in the past. This £900,000, on which the average charge for interest was a trifle over 4 per cent., had been spent on the erection of new works and plant for making and distributing the gas from the greater part of the extra 300,000 tons of coal a year above referred to. He found in the last five years the capital expenditure had been equal to £3 3s. per extra ton of coal used. This certainly was a low figure. In the previous five years, it was equal to £4 10s. 6d. per ton; but then they were buying land. During the past ten years, the expenditure worked out at £3 14s. 3d. per extra ton of coal. The shareholders might ask him how he knew that this was right. He did not know how to explain it exactly; but he thought he might take corresponding cases. In the previous decade, there were two large London Gas Companies, each about as large as theirs, who were building new works; and he found in those cases that, in the eleven years from 1869 to 1880 they expended at the rate of £9 15s. 9d. per ton on their new business, against the South Meropolitan Company's £3 14s. 3d. This, he thought, spoke for itself; and the result of their working was that they had reduced their capital from £5 11s. 7d. per ton in 1879 to £4 10s. 9d. at present. They were now raising capital. They were obliged to issue debenture stock and "C" stock in certain proportions; and the rate at which they were getting capital now was about £4 16s. 6d. per cent. They were trying to raise it at the lowest possible rate, in order to make the burden of interest as light as possible. With regard to the effect of the sliding scale on the price of gas, he desired to say a few words. A good deal of complaint was made about the increase in the price, though he could not say that there was much about their own Company. They advanced their price by 3d. per 1000 cubic feet from last September. What, however, was the case in the coal famine of 1873-4-5? At that time the Company were selling gas at 3s., and they did not put up the charge at all, but they fell back on their reserves—their undertaking was then one-eighth its present size—to the extent of £15,000. At the present period of pressure, owing to the high price of coal, they had used their reserves to the extent of £300,000; showing that this period was very much harder, and that the difficulties were very much greater, than they were in 1873-4-5. In fact, if the Company had been able to do as well this time as they did then, they would have taken only £120,000, instead of £300,000, from their reserves. n 1873-4-5, coke, tar, and ammonia realized very high prices; and in this way they recovered a great deal of the additional cost of coal. He was stating this in order to show that the present was a much harder period for gas companies to pass through than the previous one. What, however, was the result of the sliding scale? Some gas companies in the earlier period raised their price from 3s. 9d. to 5s., or 1s. 3d. per 1000 cubic feet; whereas this time the greatest increase that had taken place was only 7d. He thought they might fairly contend that the small advance in price now was due to the action of the sliding scale, which was not in existence in 1873-4-5. The sliding scale made it the interest of gas companies to keep down their price, and to avoid raising it as much as ever they possibly could. He contended therefore that it had been the cause of preventing the charge for gas from being put up to anything like the extent that it was advanced some sixteen or seventeen years ago. The only other question to which he had to refer was that of the dividend; and in connection with this subject, he desired to repeat the statement that a very large proportion of the Company's shareholders were not getting 13 per cent., although this was the dividend declared. About 30 per cent. of the proprietors—some 1150 of them in all—had purchased their stock under the auction clauses; and they were only receiving about 5 per cent., or a fraction over. It was therefore a misnomer to call it 13 per cent. in their case. The Directors had very anxiously thought over the question of dividend. They were drawing about £17,000 from their reserve fund; and they considered whether or not it would be wise to reduce the dividend. But the fact that so large a proportion of the shareholders had bought their stock by auction was felt to be a very serious objection to any reduction, particularly as the Directors thought they saw their way to "pull through" now without decreasing the dividend any further—at any rate, they hoped so. They felt that they had a thoroughly sound business, which was increasing and prospering; and so long as their business went on increasing and prospering as it had done and was doing, they might be certain that temporary periods of depression, temporary periods of bad times, or temporary periods of high prices would pass away, and that they would recover their original prosperity, and be able to meet the proprietors, declare the same dividend, and sell gas at the same low price, and, they would hope, lower than ever before. He did not think the shareholders had the slightest ground for fear as to the stability of their property. If their business were declining, and they did not see their way to hold their own, if they were on bad terms with their workmen, if coals were going to remain at their present high prices, and if coke was going to be sold permanently at low prices, they might have despondent feelings. But seeing that coal was coming down, and that the business of the Company was growing at a greater rate than it was ten years ago, the shareholders were right in thinking they had a solid property; and they would do well to keep their stock.

Captain T. B. HEATHORN, in seconding the motion, observed that the Chairman's remarks were the echo of the opinion of every Director present.

Mr. LOTT said that what the Chairman had stated was quite correct—that a large proportion of the shareholders were really only receiving about 5 per cent. on their investment in the Company; and he asked whether a plan could not be devised by which, for every £100 of "A" stock, £300 of stock might be issued. The dividend would then be the same, though appearing to be so much less.

Mr. FOSTER stated that, like everyone else, he had been greatly incommoded during the past few weeks, in going through the City, by the works in progress for starting the electric light. He asked if the Chairman could inform him what he would have to pay for an equal quantity of light by electricity if, with gas at 2s. 6d. per 1000 cubic feet, his gas bill, including repairs, cost him £50 a year. He was sure all the shareholders congratulated the Directors on their very excellent report.

Mr. FIELD asked whether any electrical plant was being laid in the Company's district. Their success had, he said, been achieved by cheap gas; and he hoped the Directors would reduce the price as soon as possible, and not wait until they could make a reduction of 3d. per 1000 cubic feet before lowering it.

The CHAIRMAN, in reply, stated that they were aware of the disadvantages of declaring a dividend of 13 per cent. when so many proprietors received only about 5 per cent., or a fraction beyond; but there were many difficulties in making any alteration. In the first place, it would very largely increase the nominal capital of the Company. The Bristol Gas Company obtained power from Parliament last session to reduce their 10 per cent. capital to 5 per cent., by doubling the amount of the capital, the greater part of which, however, was auction capital. In the case of the South Metropolitan Company, only a part of the capital was in this category. If any means could be devised by which they could put the rate of dividend on a more just footing nominally, the Directors would be quite prepared to adopt it; but they would not go to Parliament for this object. They were safe from applying to Parliament now for a considerable number of years. They could raise about £1,400,000 more capital without legislative sanction; and they intended to keep clear of Parliament, the County Council, and "all those people," as long as possible. Mr. Rice had handed him a slip of paper containing this question: "In the event of a proposal from the County Council to acquire the gas undertakings, what would be the position of the shareholders?" The first thing was to show that the public would be better served by the Company than by the Council; and he had no fear on this point. Then, if the Council wished to buy them up, they must pay the Company the recognized price; and he did not at all think that Parliament would compel them to sell their property at less than its proper value so long as they did their duty by the consumers, as they had been doing, and intended to do. As to the price of gas, they were anxious to lower it again; and they would not wait until they could bring it down 3d. before they made a reduction. As soon as possible, they would reduce it by 1d., then by another 1d., and so on. The proprietors were aware that the Company's greatest strength was in selling gas at the lowest possible figure. With regard to the electric light, the other day Professor Forbes said, at the Society of Arts, that it was nonsense to talk about electric

light being nearly as cheap as gas; its cost was equivalent to double the price of gas at 3s. per 1000 feet. Other estimates had put the cost of the electric light at three times that of gas. In answer, therefore, to Mr. Foster, if his gas came to £50 a year, it would cost him, by the lowest estimate, according to a responsible electrician, more than £100 to have the same amount of electric light; and he (the Chairman) himself believed that it would cost Mr. Foster £150. This was the Company's safeguard. Their's was a poor district, and people were not likely to pay £2 for what they could get for £1. He did not know that any electric light plant was being laid in their district, though one or two private houses supplied themselves by means of gas-engines and there was a semi-public installation at Brixton. There was a large electric lighting station at Deptford for supplying the City and the West-end; but he did not think that it was working very satisfactorily.

Mr. FOSTER: I think we may also say that a good many of our customers prefer the heat which they get from gas, and which they could not get from the electric light?

The CHAIRMAN: Yes.

The resolution was then put, and carried unanimously.

The DEPUTY-CHAIRMAN (Mr. John Mews) then proposed, and Mr. SIMPSON ROSTRON seconded, the following resolution: "That a dividend at the rate of 13 per cent. per annum be now declared, and that such dividend, with the exception of the sum of £500, be apportioned amongst the three classes of stock, as prescribed by the Scheme of Amalgamation, 1880; and that the warrants be transmitted to the registered addresses of the proprietors by post."

The resolution was unanimously agreed to; and the retiring Directors and Auditor were subsequently re-elected.

Cordial votes of thanks were afterwards passed to the Chairman and Directors, and also to the Engineer, the Secretary, and the staff.

The CHIEF ENGINEER (Mr. 'Frank Livesey), in replying for his department, observed that had it not been for the low price of coke the Company would have had a very good half year indeed. They had never gone into new schemes rashly, but they were carefully and cautiously trying all the latest systems of carbonizing, in order that, without spending money recklessly, they might find out and adopt the best. If the value of coke, and the purposes for which it could be used, were more widely known, he was sure it would be more generally employed. They could at the present time deliver coke to any manufacturer on the river at about 7s. per chaldron; and they could also deliver it now in any part of their district at about 9s. or 10s. per chaldron.

A SHAREHOLDER inquired if this included coke for household use.

The CHAIRMAN: Certainly. We break the coke especially for household purposes for a penny per cwt. extra.

The proceedings then terminated.

BRENTFORD GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Friday, at the Charing Cross Hotel—Mr. HOWARD C. WARD in the chair.

The SECRETARY (Mr. W. Croxford) read the notice convening the meeting; and the Directors' report and the accounts (which were summarized in last week's number) were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said that the former contained a little more than it usually did. The first paragraph, after that dealing with the dividend, referred to the inclined retorts which they had been erecting at Brentford and Southall; and he believed their Engineer (Mr. Frank Morris) would tell them that they were working in a most satisfactory and efficient manner, that he had perfect confidence in them, and that they would be of very great service in the future, not only to the Brentford Company, but to all gas companies throughout the kingdom. The retorts worked very easily and economically. In point of labour, the saving by them was considerable; but this was not shown in the accounts for the past half year, because they formed rather a small proportion of the total number of retorts in use, and they had not been at work for any length of time, except experimentally. What was very important, too, was that the men preferred working the inclined retorts to the horizontal ones; and, besides, being very easily operated, any set of men could work them if the regular hands were to enter upon one of those damaging strikes which had been so rife in the country during the past few years. They had now 154 inclined retorts set; and, having been satisfactory, the Directors had arranged for 84 more to be put up. In connection with this subject, he might say that these retorts had been erected to replace a large number of the old horizontal ones, which were originally paid for out of capital; and as the latter were destroyed, it was only fair to charge the new retorts against wear and tear. If the shareholders turned to the revenue account, they would see that the item of repairs and maintenance of works and plant, &c. (which was £7516 in the December half of 1890), had increased to £12,019 in the past six months. This was an increase not absolutely of cent. per cent. for wear and tear, but approaching it; and he wished the shareholders to understand that it was due to the exceptional charge for the establishment of the system of inclined retorts, and that the increase was nearly equal to the deficit of the profit required to pay the dividend for the half year. They had also been busily engaged in the erection of the new holder at the Southall works; but the wet autumn had delayed its completion, and they now hoped to get it finished by the end of March. With regard to the question of residual products, all of them had fallen in value during the half year, especially coke. As to the reason of this, a good many people differed. But he saw that their friend, Mr. Livesey (whose opinion always deserved attention), said that the price of coal and fuel was too high, and that this had depressed the cement trade. The disturbance of business in South America, in the Argentine Republic, and the want of progress there, had crippled the cement trade in a great degree, and had made it unnecessary to export cement there, where it was very largely used. He (the Chairman) hoped this state of things would pass away, and that the cement trade would again develop, so that coke would return to its former value.

Referring next to the appeals which the Directors had made against the new assessments, the Chairman said they had not yet been heard; and he would not therefore say anything about them, except that they had charged the rates and taxes for the half year according to the new assessment, and the item amounted to about £1193 more than in the corresponding period of 1890. Of course, if they obtained a reduction upon the assessment (he supposed they would, and he believed Mr. Monier-Williams would tell them so too), that would be an asset to the good. The matter was not yet determined; and if they could settle it out of Court, the Directors would be happy to do so, instead of going through the expensive litigation which was involved in getting a case of this kind decided. The business of the Company, the Chairman proceeded to remark, continued to grow in a very healthy manner. The meter and stove rental had increased in a higher proportion than in previous half years; and things were looking tolerably rosy. Dealing next with the accounts, he said that they had expended out of capital during the half year £23,485. This was mostly spent on the new gasholder, which would put the Company in a good position for a considerable time, and the Directors hoped it would enable them to do away with Sunday labour. Having spent this money, it made the total capital expenditure £788,678; and as the receipts on capital account amounted to £789,699, they were reduced to a balance in hand of £1021 to carry on the business. This explained the paragraph in the report, which stated that the Directors were about to issue a further £30,000 of the 1881 stock. Respecting the revenue account, the receipts for gas, meter, and stove rental had increased by £2545; but, on the other hand, they had to pay considerably more for coal. In the December half of 1890, they were working upon old and favourable contracts. But then the price of coal advanced; and they had been obliged to make other contracts, which had increased the cost, including labour, by 8d. per ton, and this, on the amount of coal they used, made a considerable difference. The total of this increase in the half year had been £3760, which was more than the addition they had obtained on the gas and meter rental. The coal had not only been dearer, but it had not been so good. Whether it was by reason of the troubles the coal owners had had with the miners in the north or through the wet season, he could not say, but the coal had been delivered in a very wet and dirty condition; and although their men worked in very good spirit, it was impossible for them to produce as much gas from coal of this description as from dry and clean material. It would be seen that the carbonizing wages were about £1060 more than in the corresponding period of 1890; and there was a very singular thing about this—that in the half year just ended, they had 27 weeks' wages to pay instead of 26, and a week's carbonizing wages amounted to about £1000. The whole result of the working during the half year, was this—that, compared with the six months ending Dec. 31, 1890, there had been a diminution in the profits of between £13,000 and £14,000. The amount required for dividend was £31,462, towards which they had £25,500; showing a deficit of £5945, which the extra wear and tear and the additional week's wages nearly balanced. He hoped that during the present six months the Company would see better times. They would, of course, have the partial charge for the new inclined retorts which they were substituting for the old ones. As a matter of interest to those who went into the working minutely, he stated, in conclusion, that the capital per ton of coal carbonized amounted to £6 16s.; coal had cost about 8d. per ton more than in the second half of 1890; the carbonizing wages were 2d. per ton more; the repairs and depreciation of plant, 1s. 5d. per ton more; and rates and taxes, 4d per ton more.

Mr. J. ORWELL PHILLIPS seconded the motion.

The CHAIRMAN, in reply to questions put by Mr. Montague, Mr. J. Rokeby Price, and Mr. J. H. Meyers, said that the price charged to the consumers was now 3s. per 1000 cubic feet. Their initial price was 3s. 9d.; so that, under the sliding scale, they were entitled to the 12¼ per cent. dividend recommended in the report. The Directors would as early as possible, reduce the price. As to the production of gas per ton of coal, the average was 10,002 cubic feet; and the quantity sold, 6874 cubic feet. These figures compared favourably with those of the London Companies. Regarding the question of manufacturing gas from oil, he said that he believed it would be of very great use in cases of emergency; but it was still a matter of experiment. One patent process was being tried at the Company's works; but not at their expense. They told the people who were making the experiment that, if they could show good results, the Company would buy the plant; but until they did that, they would not take it.

The motion was then carried.

On the proposition of the CHAIRMAN, seconded by Mr. PHILLIPS, the dividends recommended were declared—viz., at the rate of 5 per cent. per annum on the 5 per cent. preference stock, of 12¼ per cent. on the consolidated stock, and of 9¼ per cent. on the new 1881 stock, all subject to income-tax.

Resolutions were then passed, re-electing the retiring Directors (Mr. H. C. Ward, Mr. Ulick J. Burke, and Mr. J. S. Neville) and the Auditors (Mr. J. W. Field and Mr. Monier-Williams), and thanking the Chairman and Directors, the Secretary, the Engineer, and the other officers of the Company for their services during the half year.

The proceedings then terminated.

Rushden and Higham Ferrers District Gas Company, Limited.—A Company has been formed to acquire the undertakings of the Rushden Gas and Coke Company, Limited, and the Higham Ferrers Gas and Coke Company, Limited, and to carry on and extend them in all their branches. The capital is £10,000, in 2000 shares of £5 each. Our readers will remember that these two undertakings have been in process of amalgamation for some time; but the union could only be effected by the liquidation of the old Companies and the formation of a new one to take over the concerns. This has now been done. Mr. J. T. Lewis, of Wellingborough, has been appointed Consulting Engineer to the new Company; and, under his supervision, fresh works, fitted with the most modern appliances, will be constructed in a position suitable for the supply of both Rushden and Higham Ferrers and every effort will be made to have them available by next winter.

LIVERPOOL UNITED GASLIGHT COMPANY.

The Half-Yearly Meeting of this Company was held last Tuesday—Mr. E. LAWRENCE in the chair.

In their report, the Directors recommended the declaration of a dividend for the half year ending Dec. 31 last of 5 per cent. on the ordinary consolidated stock, and of 3½ per cent. on the 7 per cent. stock issued prior to July 1 last.

The CHAIRMAN, in moving the adoption of the report, said that the Company had no difficulty in recommending the dividends mentioned, as the accounts made up to Dec. 31 showed a very satisfactory result. Speaking of the position of the Company, he said they had passed over the pinching time of the year—that period of winter when the consumption of gas was highest—without any of the difficulties that attended them in the previous winter. It was quite true that, for two or three days about Christmas, the demand made by the public upon their resources was greater than their producing powers; but with the large stock of gas in hand in the holders, they had no trouble in supplying the public with all their requirements, although they were great, without reducing the pressure usually given. They were spared all those complications which arose in the previous winter from the long-continued frosts and excessive fogs that interfered with railway arrangements, &c.; and the working of the concern this winter had proceeded smoothly. He might mention that the production of gas during the last eleven weeks had been, on the average, upwards of 100 million cubic feet per week—a record that had never been known before in the annals of the Company. This showed that, in spite of high prices and the competition of electricity, the consumption of gas was steadily increasing. From the 1st of July to the present time, the actual consumption was nearly 2¾ per cent. in excess of what it was in the previous year. He thought this was satisfactory to the shareholders, as showing that, whatever might be the competition (and they did not ignore it) of the electric light, the demand for gas still continued, and enabled the proprietors to feel every confidence in the value of the stock of the Company. It was to the interest of the Directors that the price of gas should be as low as possible; and it was with the greatest possible regret that they felt compelled to raise it on the 1st of July last. With regard to the future, no doubt the shareholders would be aware that there had been a decline to some extent during the last six months in the price of coal; but whether this would affect the price of gas coal as much as steam coal, he did not know. He was sorry to see that there was a combination of workmen to reduce the output of coal; and if they were successful, he was afraid the reduction in the price of gas would have to be relegated to the distant future, though nothing would give the Directors greater pleasure than to announce a decrease at an early date. He referred with regret to the illness of their Engineer (Mr. William King), who had gone abroad to recruit his health.

Mr. H. B. GILMOUR seconded the motion, which was passed.

The dividends having been declared,

A Special Meeting of the shareholders was held for the purpose of considering a resolution to the effect that, in pursuance of the Company's Act of 1886, such an amount of stock be created as may be necessary to raise the sum of £280,533, being the balance of the capital authorized by that Act, and that the stock be sold in the manner most advantageous to the Company.

The CHAIRMAN moved the resolution; and, in answer to questions, he said that the stock would be sold by auction as the money might be required. As to the necessity of raising the capital, he stated that it was required in order to proceed with the works at Linacre. It had been the policy of the Directors to keep down the capital. But they now felt it their duty to the public, seeing that they had had nearly a deadlock last winter, to raise it; and if they did not, the consequence would probably be something more serious than the expenditure of capital.

The resolution was passed; and afterwards sanction was given to the promotion of a short Bill in Parliament, to enable the Company to utilize a strip of land lately purchased for the enlargement of the gasholders at the Athol Street works.

The proceedings terminated with a vote of thanks to the Chairman.

BRISTOL GAS COMPANY.

The report which the Directors of the Bristol Gas Company will lay before the shareholders at their half-yearly general meeting next Friday cannot be objected to on the ground of length, as it consists of only four paragraphs. The story told is simply that there has been a steady increase in the consumption of gas, and that it has been necessary to make enlargements and extensions in order to provide for future demands. The maximum dividend, at the rate of 5 per cent. per annum (subject to deduction of income-tax), on the nominal capital of the Company entitled thereto, will be recommended. The accounts by which the report is accompanied show that a sum of £90,983 was received for gas consumed in the ordinary way, and £12,290 for that used in the public lamps and supplied under contract. As compared with the latter half of 1890, these figures exhibit advances of £6966 and £891. The residuals yielded £26,745, as against £26,550; and the total receipts for the half year were £132,263, as against £123,941 in 1890. The expenditure on the manufacture of gas was £89,126, as against £77,948; coal going up from £47,129 to £52,245, and wages from £15,369 to £16,931. The outlay on the repair and maintenance of works and plant rose from £11,351 to £14,996; and the total expenditure, from £93,331 to £106,720. The balance carried to the profit and loss account is £25,542; whereas at the close of 1890 it was £30,609. This account shows that the sum available for division is £29,896; and if the dividend recommended should be declared, £22,212 of it will be absorbed—leaving £7684 to go forward. The quantity of coal carbonized in the period covered by the accounts was 72,037 tons; of cannel, 12,744 tons. The gas made was 790,768,000 cubic feet, as compared with 779,221,000 cubic feet in the latter half of 1890. Of the former quantity, all is accounted for but 67,278,348 cubic feet; of the latter, all but 79,435,042 cubic feet. The residuals produced are estimated as follows: Ordinary coke, 46,384 tons; cannel coke, 8315 tons; breeze, 5967 tons; tar, 867,267 gallons; ammoniacal liquor, 2,003,704 gallons. In connection with the working of the Company, it may be mentioned that there was a large expenditure on capital account in the past half year; the total at June 30 last (£782,142) being brought up to £801,819, leaving a balance of only £4608. The outlay consisted of £14,605 on buildings, plant, &c.; £2682 on mains and services; £1233 on meters and stoves (less £376 for depreciation of the latter); and £1531 on parliamentary expenses. In the course of the half year the capital was increased by the issue of £20,000 of new debenture stock, which produced, with premiums, £20,748. A similar amount of debenture stock was submitted to public auction last Wednesday, and realized £20,668.

NEWCASTLE AND GATESHEAD GAS COMPANY.

The Annual Meeting of this Company was held last Wednesday—Mr. W. B. WILKINSON in the chair.

The Directors' report (the principal portions of which were noticed in the JOURNAL last week) having been taken as read,

The CHAIRMAN, in moving the adoption of the report, said the capital expenditure for the year had been £33,515, which was principally spent in extending their works. This had been raised by the issue of debenture stock at 3½ per cent. They were limited in the issue of this stock to one-quarter of the paid-up capital; and, therefore, they could not issue any more until they created and sold more ordinary stock, which they would ask the proprietors to give them permission to do at the close of the meeting. The receipts for the year had been £219,383, against £211,443 for the previous year, or an increase of £7940. This increase would have been larger by about £3500 had they not lowered the price of gas in the last quarter from 2s. to 1s. 10d. per 1000 cubic feet. The expenditure had been £175,779; being £25,132 more than in the previous twelve months. About £21,000 of this was due to the increased price of coal. They had made more favourable coal contracts for the present year, and hoped to continue the reduced price throughout the year. The consumers would benefit by the reduction in the fifteen months to the extent of £15,000; while the shareholders would only get £2750 by the reduction. To pay 9¼ per cent. dividend for the year, they took the undivided profit in 1890 (£6611), and an additional sum of £4493 from the undivided profits of previous years. They could well afford to do this, and hoped it would meet with the shareholders' approval. They had added to renewals £4411 properly chargeable. One of the items was for a new locomotive to replace one worn out, and another one had had very extensive repairs, and had been made equal to new. They contemplated also a renewal fund and creating a reserve fund. The reserve would be invested in Government or other securities; and the interest accruing would be added from time to time, and additions made from profits, until it reached 8 per cent. of the paid-up capital. This would be available to meet extraordinary expenses. Speaking of the progress of the business, he said that in about 20 years they had doubled it. In 1873, the average price of coals was 16s. per ton; and some were bought as high as 25s. per ton. The total receipts for that year were £115,526; and the half-year's dividend was only £3050—a very great contrast with the present dividend of nearly £25,000 for the half year. There had been used during the past year about 175,000 tons of coal, which had produced 1,894,000,000 cubic feet of gas, 105,000 tons of coke, 1,575,000 gallons or 8000 tons of tar, and 1323 tons of sulphate of ammonia. He did not wish unduly to magnify their position; but their property was a valuable one, and remained an excellent investment. They had made considerable extensions to mains during the year for the purpose of improving the supply, and intended to do considerably more in the near future. Eleven miles of pipes had been laid in the course of the year, making a total of 511 miles in all. The number of public lamps had been increased to about 8000. At their last annual meeting, it was stated that they would probably have to extend the works at Redheugh. They were desirous to put this off as long as possible; but the increasing demand for gas warned them that it was not safe to sail too near the wind. So they decided first of all to increase the storeage, so as to be able to store about a full day's make in winter. They had in hand a holder capable of containing 3,000,000 cubic feet, the cost of which would be about £29,000. Their production at present was about 10,000,000 feet per day. They had storeage room for only 6,750,000 feet; but when they had their new holder in use, which they hoped would be next winter, they would be able to store 9,750,000 feet; and they would then be in a proper position in regard to storeage. They were also erecting some new retorts, which would be brought into use next winter. They had reduced the leakage during the year by about 20,000,000 feet, and hoped to get it further reduced during the present year. When the cost of wages and coals went up, the necessity came upon them to economize in every possible way, without losing in efficiency. The result of their endeavours was extremely satisfactory; and, by alterations now in progress, they hoped to save several thousands of pounds during the year. This would be principally in the means of getting steam to work their exhaust-engines, and in an improved method of producing sulphate of ammonia. Their position generally compared well with that of other companies. The price of gas in London was 3s. 1d. per 1000 cubic feet, and in Newcastle it was 1s. 7¾d. net; while in regard to quality, they compared favourably with the London gas. He was not aware that gas had been sold anywhere before at 1s. 7¾d. net; and they hoped ultimately to get it down to 1s. 6d. When that time came, they would have to be content, and try to increase the purity and illuminating power by adding vapourized oil, or by some other contrivance. Some inquiries had already been made with this view; but they intended to proceed cautiously. They had 1290 cooking stoves out on hire; and there were in use about 130 gas-engines, consuming probably 130,000,000 cubic feet of gas a year. He concluded by moving that the report be adopted, and that a dividend of £4 12s. 6d. per cent. be declared for the half year ended Dec. 31 last.

Mr. E. LEADBITTER seconded the motion.

Dr. MACAULAY wished to draw their attention to a new gas, which he thought would greatly improve the quality of the coal gas at present used. He had heard during the past year frequent complaints as to the deficiency in the illuminating power of the Newcastle gas. The new gas was hydro-oxygen gas. It was manufactured from crude oils, which were refined during the process of manufacture. By the use of this gas, 15-candle coal gas could be increased to 20 candles at a cost of 3d.; while the additional cost of coal gas to give the same power would be 8d.

The motion was carried.

The retiring Directors and Auditors were re-elected; and this concluded the business of the ordinary meeting.

A Special Meeting was then held, and the Chairman moved the following resolution: "That under the power of the Newcastle-upon-Tyne and Gateshead Gas Act, 1879, and of the Acts incorporated therewith, the existing capital of the Newcastle-upon-Tyne and Gateshead Gas Company be now increased by the creation of £50,000 of new consolidated stock, part of the additional capital authorized by the above-mentioned Act, which stock shall for all purposes form and be part of the general capital of the Company."

Mr. LEADBITTER seconded the resolution; and it was agreed to.

The CHAIRMAN observed that in the course of a few weeks the new stock would be sold by auction. They had not decided yet how much would be offered; but it would be probably £15,000 or £20,000.

A vote of thanks to the Chairman terminated the meeting.

TOTTENHAM AND EDMONTON GAS COMPANY.

The Half-Yearly Report and Accounts.

The report of the Directors of the above Company, with the accounts for the six months ending Dec. 31 last, has been issued, in view of the half-yearly general meeting of shareholders next Saturday. In their report, the Directors state that, in the period to which it refers, there was a further increase in the quantity of gas sold—equal, as compared with the corresponding half of 1890, to 5,079,000 cubic feet; or 3·289 per cent. They remark that this is the more satisfactory as the latter portion of the past year was not nearly so cold and dark as the period with which it is compared. It may be reasonably presumed that this additional consumption of gas has been for culinary purposes, seeing that 173 stoves have been added to the number in use by the Company's customers; being a gain of 63·60 per cent. as compared with the second half of 1890, and bringing up the total to 445. The Directors allude to the lowness of the price of all the residual products made for sale, which reduces the amount brought to credit, although the quantities of coke, tar, and sulphate of ammonia produced have been greater. But, at its present figure, coke is so cheap a fuel relatively to coal, that the Directors do not fear any considerable reduction in its market value. The continued high price of the raw material of gas manufacture is alluded to. The Directors state that the purchases made have been at lower prices; but the large quantity of coal in stock at the commencement of the half year, and the running contracts at old rates, have kept the charge high. The gratifying statement is made, however, that the current six months will show an improvement in this respect. It is scarcely necessary to add that the works and plant, which are under the supervision of Mr. W. H. H. Broadberry, have been maintained in a condition of thorough efficiency. The accounts accompanying the report show that the expenditure of £25,297 produced a revenue of £32,121; leaving a balance of £6824 to go to the profit and loss account. Of the total revenue, a sum of £24,976 was for the supply of gas; meter and stove rental returned £595; and residuals, £6464. On the other side of the revenue account, the most important item is that of coals, which cost the Company £13,445; the other manufacturing charges (wages figuring for £3166) bringing this amount up to £19,731. The expenses of distribution were £1587; and those of management, £1451. Rent, rates, and taxes came to £1687; and other items (of minor importance) make up the above-mentioned total expenditure. The statements as to the working show that 14,487 tons of coal and 686 tons of cannel were carbonized. The treatment of this bulk of raw material resulted in the production (in addition to 159,497,000 cubic feet of gas actually sold) of 9255 tons 2 cwt. of coke, 1726 chaldrons of breeze, 170,230 gallons of tar, and 465,696 gallons of ammoniacal liquor worked up into sulphate. The business of the past half year resulted, as already stated, in a profit of £6824; but the amount available for division is £7412. Out of this the Directors recommend the payment of the following dividends (less income-tax): 11½ per cent. per annum on the "A" stock, and 8½ per cent. per annum on the "B" and "C" stocks. This will leave a balance of £1148 to be carried forward. The payment of these dividends will reduce the undivided balance by only £157. The Directors consider it is a matter for congratulation that, though most of the items of manufacture, especially coal and wages, have been greatly increased, it has not been found necessary to raise the price of gas or reduce the rate of dividend.

The Electric Lighting Question at Coventry.—A report by the Electric Lighting Committee, which was first presented to the Coventry City Council on Nov. 9 last, but was deferred to allow the members an opportunity of considering it, was again before them at their meeting on the 2nd inst. The report was prepared by Mr. A. B. Holmes; and it was thus summarized: "(1) That having regard to local circumstances, the Corporation would do wisely to keep the electric lighting of the city in their own hands. (2) That no advantage is to be gained by delay in commencing operations. (3) That a low-tension direct-current system should be adopted, and that the sum of £32,000 would cover the necessary expenditure." There was a short discussion on the subject, in the course of which the Town Clerk stated that the Council were not compelled to take action before June next year. From their remarks, the members did not appear to be in any hurry to proceed in the matter; and they resolved to defer the consideration of the report for six months, and then, if thought desirable, for a further similar period.

PROVINCIAL GAS AND WATER COMPANIES.

The following paragraphs contain the principal features of the financial statements and reports of the proceedings at meetings of the various Provincial Gas and Water Companies referred to:—

Gas Companies.

The report of the Directors of the Barnsley Gas Company, which was noticed in the last issue of the JOURNAL, was submitted at the meeting of the shareholders yesterday week. The Chairman (Mr. E. G. Lancaster), in moving the adoption of the report, said, acting on the principle they always adopted, he would first refer to the unpleasant side of the balance-sheet. In two years the cost of coal had increased by £2272. In the year 1889, they paid an advance over the previous year of 1s. 4d. per ton. In the following year, there was a further increase of 1s. 4¾d. per ton; and in the past year, a still further increase of 1s. 4¼d. per ton was imposed—making the advance for the three years 4s. 1d. per ton, or an increase of 60 per cent. over 1888. With figures like these, it was not to be wondered at that companies increased the price of gas in large centres of consumption such as London—3d. in the case of the South Metropolitan Company, and 7d. in that of The Gaslight and Coke Company; Leeds, Halifax, and Liverpool, 4d.; Boston, 5d.; and Bristol, 8d. In fact, throughout England the exception was where there was a company which had not increased the price. During the year they had an increase of £1600 for repairs. The cost of the manufacture and distribution of gas was £16,225, against £12,831 in the preceding year, which showed an excess of £3493 in expenditure. They had obtained a new railway engine at a cost of £800; something like £200 had been expended on the extension of sidings, and about £500 had been laid out on retorts. To these items had to be added £1208 extra for coal, and £200 for new meters. Altogether these figures amounted to about £3000, which caused the difference. Then with regard to the pleasant side of the balance-sheet, they had sold something like 10 million cubic feet of gas more, which produced £1290. Their total make of gas was 131,500,000 cubic feet; and they had sold 115,500,000 cubic feet. There was an increase of £400 in the sales of coke, &c. With regard to the dividend, they proposed, by withdrawing £1226 from the reserve fund, to pay the usual dividend. Mr. Cooper seconded the motion, which was carried unanimously.

According to the report of the Directors of the Bath Gaslight Company, the working in the half year ending Dec. 31 last was, on the whole, satisfactory. Less coal was carbonized than in the corresponding period of 1890, and the consumption of gas was rather less; but this was owing to the mildness of the season. The report further states that the stoking machinery which was erected in 1889-90 has given satisfaction, and the Directors are now extending its use, hoping for further good results. The total revenue for the half year was £33,198, of which £25,835 was produced by gas, £483 by meter-rental, £219 by stove-rental, £6379 by residual products, and the remainder was made up of small items. The expenditure amounted to £27,429; leaving a balance of profit of £5769. The disposable balance at the profit and loss account is £9719; and the Directors recommend the declaration of maximum dividends.

At the half-yearly meeting of the Brighton and Hove General Gas Company to be held on the 4th prox., the Directors will report a small increase in the sale of gas, but a considerable fall in the value of residual products, in the six months ending Dec. 31 last, as compared with the corresponding half of the year 1890. An increased expenditure is shown in the revenue account, principally due to an advance in the price of coal. The total receipts in the half year amounted to £81,577, as compared with £82,204 in the corresponding period of 1890; the expenditure, to £62,452, as against £57,684. The balance carried to the profit and loss account is £19,125, as compared with £24,520. The amount available for division is £38,205; and the Directors recommend that dividends at the following rates should be declared: 11½ per cent. per annum upon the original shares, 8½ per cent. per annum upon the "A" ordinary shares, and 6 per cent. per annum on the "B" preference shares. With regard to the works, the new retort-house commenced last year has been completed, and part of it brought into use; and the construction of the remainder of the third section of the works is in progress. The quantity of coal and cannel carbonized in the past half year was 43,455 tons; the residual products being 54,061 chaldrons of coke, 443 chaldrons of breeze, 406,187 gallons of tar, and 963,761 gallons of ammoniacal liquor. The quantity of gas sent out for private consumption was 421,525,000 cubic feet, all of which, with the exception of about 11 millions, was sold at 2s. 9d. per 1000 cubic feet; and 33,120,839 cubic feet were employed in the public lighting or were sold under contracts.

The report which was submitted at the recent half-yearly meeting of the Chesterfield Gas and Water Company stated that the net profit for the six months was £3999. From the revenue account it appeared that the income from water had been £3578; from gas, £5036; and from residual products, £804—a total of £9418. The expenditure on water had been £1224, and for gas £3771—making a total of £4995, and leaving £4423 to be carried to net revenue account. After paying interest on mortgages and prepaid calls, and adding the balance from the previous half year, there was a sum available for division of £5691. The Directors recommended the payment of a dividend at the rate of 5 per cent. per annum, which would absorb £3907, and leave £1785 to be carried forward. The Chairman (Mr. R. T. Gratton) moved the adoption of the report and accounts; and it was carried.

The Colchester Gas Company held their half-yearly general meeting last Friday, when the Directors reported a steady increase in the consumption of gas, and, as a consequence, referred to the necessity for enlarging the mains in certain places. Various improvements were carried out in the works during last year; one being the extension of the coal-store, which allows all the coal to be placed under cover. In connection with this, two hydraulic lifts have been erected, whereby the coal can be run to any part of the store. The receipts for gas in the six months ending December last amounted to £8668; the total revenue being £11,139. The expenditure was £9009; £4903 being for coal, about £1100 for salaries and wages, and £1968 for repairs and

maintenance. The balance was £2130. The Company have unfortunately sustained a loss by the failure of their bankers; but this did not prevent the payment of the usual dividend.

The ordinary general meeting of the Ipswich Gas Company was held in the Board-room at their new offices, briefly described in the JOURNAL last week, on Monday, the 15th inst.—Mr. Sterling Westhorpe presiding. The report of the Directors, of which an abstract has been already given (*ante*, p. 301), having been presented, the Chairman moved its adoption; calling attention, in doing so, to the fact that there had been a large increase in the manufacture of gas, and stating that the expenditure, especially in regard to repairs and maintenance of works and plant, had been very judicious. The outlay for the renewal of mains and service-pipes would, he remarked, be followed by a further reduction in leakage, which had within the past few years been brought down to the extent of one-third. Mr. Biddell seconded the motion. Dr. W. A. Elliston expressed the hope that the price of gas would not be raised, as suggested in the report, unless there were decided reasons for doing so. There had been a large increase in the use of gas for heating purposes; and this depended greatly upon its being sold at a moderate price. The Chairman replied that it was not proposed to increase the price of gas; but if coal should continue at its present figure, and residuals go down as they were threatening to do, the Directors would have to consider the matter. Mr. Talbot also hoped the Directors would not see any reason to raise the price of gas; and he referred to the competition of the electric light and crystal oil—the latter being, in his opinion, a much superior light. Mr. D. Ford Goddard said he trusted the shareholders would not be alarmed in regard to the suggestion in reference to raising the price of gas. If they took any trouble to ascertain what other gas companies had been doing in England, they would find that the Ipswich Company had been exceedingly fortunate in not having increased their price up to the present. They had been sufficiently economical and prosperous to avoid doing so; but they could not control the price of coal. It would not, in his opinion, make very much difference to the consumption of gas in Ipswich whether the price was 2s. 10d. or 3s. per 1000 cubic feet. With regard to the electric light, he did not think the shareholders need fear raising the price of gas 2d. The Electric Light Company in Ipswich supplied a few choice customers; but they did not do a trade which was likely to produce any bad debts. Of the two Provisional Orders applied for, permission had been asked to withdraw one; and this did not look as if they were very eager to bring the electric light to Ipswich. When they did propose to supply it, it was for a limited area or for a favoured circle. Crystal oil, he agreed, was a severer competitor than the electric light. Mr. Biddell thought an increase of 2d. would hardly be felt; and unless the shareholders were prepared to take less dividend, the Directors would, he feared, have to put up the price a little. They had given the consumers a wonderfully good time during the past three years; comparing Ipswich with other towns in the kingdom. The report was adopted. It was then decided to follow up the interim dividend by dividends of 13s. per share on the "A," 10s. 6d. per share on the "B," and 10s. per share on the "C" shares; making the three dividends for the year 11¼, 9, and 8½ per cent. respectively. The retiring Directors were next re-elected; and it was decided not to appoint anyone to fill a vacancy which had occurred—it being in contemplation to eventually reduce the number from nine to six. The retiring Auditor was then re-appointed; and the proceedings closed with votes of thanks to the Chairman and Directors, and to the Secretary and Engineer (Mr. J. T. Jolliffe).

The accounts of the Leominster Gas Company for the past year show a net profit of £588, from which the Directors recommend a dividend at the rate of 10 per cent. per annum on the original shares, and 7 per cent. per annum on the "B" shares. The increase in the consumption of gas was, the report states, at the rate of over 4 per cent. During the year a new and more powerful exhauster was put in; the washer-scrubber was renewed with wooden bundles; a tar extractor was purchased; and some of the retorts were renewed. These renewals and improvements, and the increase in the cost of coal, diminished the profit of the year. There is, however, no reason to suppose that it will be necessary to raise the price of gas.

The half-yearly general meeting of the Newport (Mon.) Gas Company took place on Monday last week, under the presidency of Mr. E. J. Phillips. In their report, the Directors recommended the payment of the maximum dividends—viz., 5 per cent. on the "A" stock, 3¾ per cent. on the "B" stock, 3⅓ per cent. on the "C" stock, and 2½ per cent. on the debenture stock—for the past half year. In moving the adoption of the report, the Chairman remarked that, in order to pay the usual dividends, they would have to take £862 18s. 6d. from the profit and loss account. That was satisfactory in this respect—that twelve months ago, in order to pay the full dividends, they had to draw £1303. The Directors were desirous of supplying the very best gas at the lowest figure; and there was no necessity now for any advance in the price. They hoped there would soon be so great an increase in the consumption of gas in the town as would enable them to pay the maximum dividends without drawing from the profit and loss account. The illuminating power of the Newport gas had been kept, during the whole of 1891, one candle power above the standard required by the Act of Parliament; and this meant an extra outlay of £1300 to the Company. They expected to spend out of capital during the next 12 or 15 months about £25,000 in the erection of a new gasholder and tank, and the provision of new mains (under the supervision of Mr. T. Canning, Assoc. M. Inst. C. E., the Company's Engineer). The report was adopted; and the dividends recommended were declared. The proceedings closed with the customary votes of thanks to the Directors and officers.

To-day the shareholders of the Reading Gas Company will have before them, at their half-yearly general meeting, the report of the Directors and the accounts for the six months ending Dec. 31, 1891. The payment of full dividends on all the stocks and shares of the Company will be recommended; the profit and loss account showing that the Directors are justified in this course. In their report, they congratulate the shareholders upon the continued success of the Company; and, in proof of the excellent results obtained by the improved system of working adopted during the past three years, they refer to the figures contained in the last parliamentary returns relating to gas undertakings, which show that these results exceed those of any other gas company—a fact which the Directors acknowledge to be largely due to the able efforts of their Engineer and Manager (Mr. E. Baker, Assoc. M. Inst. C. E.). During the past six months, the Directors have had under consideration the subject of electric lighting; many persons in the town (which has already a supply by an electric lighting company) having expressed the opinion that the Gas Company, or some authority emanating therefrom, and worked in conjunction therewith, might undertake it. With the knowledge they have obtained, however, the Directors feel that at present it would be unwise, and might be deemed misleading, if, before it has been ascertained beyond a doubt that the employment of capital for the purpose mentioned will achieve some degree of commercial success, they were to take steps to place themselves in a position to ask the shareholders and the public to invest their money in such an undertaking. At the same time, they will continue to watch the whole question very closely. Turning to the accounts, the receipts for gas in the second half of last year amounted to £20,597; residuals produced £6741; and the total income was £27,364, as compared with £26,450 in the corresponding half of 1890. The expenditure was £21,750, against £21,413. There were carbonized 12,890 tons of coal, which produced as residuals 12,890 chaldrons of coke, 148,650 gallons of tar, and sufficient ammoniacal liquor to yield 120 tons of sulphate of ammonia. About 129¼ million cubic feet of gas were sold to consumers within and beyond the borough; and 9¼ millions were supplied for public lighting and under contracts.

The annual general meeting of the Redhill Gas Company was held last Thursday, when the Directors were in a position to show a balance of £4455 on the past year's working. Out of this they placed £200 to the reserve fund and £64 to the renewal fund; leaving £4191 available for division. They recommended a dividend of 10 per cent., less income-tax; and as 4½ per cent. was paid in September, there will be a balance of 5½ per cent. to come to the proprietors on the 1st prox. Last year was in many ways an anxious one for the Directors; and the state of the labour market, the high price of coal, and the fluctuations in the value of residuals taxed the skill of the Board and the Manager (Mr. C. Read). The total receipts amounted to £13,848; the expenditure, to £9393—leaving the above-mentioned balance of £4455. There were 5821 tons of coal and cannel carbonized; the residuals being: Coke, 4872 chaldrons; breeze, 849 chaldrons; tar, 64,855 gallons; ammoniacal liquor, 174,000 gallons, the bulk of which was worked up into sulphate of ammonia. The report was adopted; and the dividend recommended therein was declared.

The half-yearly meeting of the Wakefield Gas Company was held yesterday week. The report showed that the balance available for dividend was £7192, out of which the Directors recommended the payment of dividends at the rate of 11½ per cent. per annum on the old shares, 9 per cent. on the £5 "B" fifths, and 8½ per cent. on the new £10 shares. In moving the adoption of the report and accounts, Dr. Statter, who presided, said that although they had used less coal they had made more gas during the half year. The average production had been 10,000 cubic feet per ton of coal, which was more than had ever been made by the Company since its formation seventy years ago. The total receipts had been £18,408, and the expenditure £12,385; leaving a balance of £6023 to be carried forward. The sale of gas had brought in £421 more; but £401 had been lost on the residuals. The total income had been £36 more than a year ago; and the expenditure, £864 less. The Directors had decided to reduce the price of gas 2d. per 1000 cubic feet from Jan. 1, which they estimated would cost about £1600 a year; so that the surplus on the half year would just meet the reduction. The report and balance-sheet were adopted.

At the ordinary general meeting of the Wellingborough Gas Company, Limited, held yesterday, the Directors reported that the Company's business during the six months ending Dec. 31 last had been satisfactory. The receipts amounted to £5168; and the expenditure was £3765—leaving a balance of £1403. The quantity of coal carbonized was 2609 tons; the gas made, 27,018,000 cubic feet, or 10,355 cubic feet per ton. Of the total make, 25,838,300 cubic feet were accounted for; 25,597,200 cubic feet being sold—equal to 9903 and 9811 cubic feet per ton respectively. The loss was 4·36 per cent. Of coke there was produced for sale 9 cwt. 2 qrs. 20 lbs. per ton of coal carbonized. The other products were: Tar, 37,366 gallons; ammoniacal liquor, 70,545 gallons; sulphate made 17 tons 15 cwt. The usual dividend of 5½ per cent. was recommended.

The report of the Directors of the Weymouth Consumers' Gas Company for the half year ending Dec. 31 last, noticed in the JOURNAL for the 9th inst., was presented at the general meeting of shareholders held on the following Thursday, under the presidency of Mr. Alderman Thomas. In moving its adoption, the Chairman remarked that the statutory dividend recommended therein had not been obtained without great care on the part of those who had taken the direction of the Company's affairs. The present year had had a rather depressing influence upon their residual products; and the sale of coke had been considerably diminished in consequence of the mild weather. Sulphate of ammonia, too, which realized a large profit a few years ago, was now nearly 100 per cent. lower than formerly. This he attributed in a great degree to the depressed state of agriculture; farmers being unable to use artificial manures so freely as they did when things were more prosperous. He hoped things would take a turn, and that residual products would again be a large item in the receipts of the Company; thus enabling them to maintain the statutory dividends which they had for so long a time been able to declare. Last year, as the shareholders would remember, was most severe, and there was a very large output of gas for both fires and lighting. The present one had been much milder, and there had not been a great demand for gas as compared with this time last year. Notwithstanding this, however, it was gratifying to be able to state that there had been a steady increase in consumption, amounting to something approaching 750,000 cubic feet during the year. Mr. R. W. Reynolds seconded the motion, and it was carried. The retiring Directors and Auditor having been re-elected, a vote of thanks was accorded to the Chairman; a similar compliment being paid to Mr. J. Lowe (the Secretary and Manager), and the other officials of the Company, for the efficient manner in which they had discharged their duties.

The half-yearly balance-sheet of the Yeadon and Guiseley Gas

Company shows that the revenue from the sale of gas and meter-rents is £4133; from the sale of coke, tar, and liquor, £1254; and from bonus and interest, rents, &c., £154—making the total receipts on the revenue account £5541. On the expenditure side, £3162 has been spent in gas manufacture, £410 in repairs, and £674 in rates, taxes, management expenses, &c.; the total expenditure amounting to £4276, and leaving a balance of £1265 available for division. The Directors recommend the payment of the usual dividends of 10 per cent. per annum on the consolidated stock (£11,725), and 7 per cent. on the new shares (£17,600).

Water Companies.

The revenue account of the Liskeard Water Company for the past year showed a balance amounting to £1044. After the payment of an interim dividend, and maintenance, interest, and rents, a disposable balance remained of £516, out of which the Directors recommended a dividend at the rate of 9 per cent. per annum, free of income-tax. The report and accounts were adopted at the recent meeting of the shareholders.

The business of the Newcastle and Gateshead Water Company continues to expand in a satisfactory manner. The Directors' report for the past year states that there has been an increase in the revenue of £3317. After paying all working expenses, interest on debenture stock and loans, and after deducting the interim dividend paid in August last, and adding the net revenue on the year to the balance brought forward, there remains a sum of £46,370, which the Directors recommend to be appropriated as follows: To the payment of the dividend on the preference stock (£6541); to the payment of a dividend at the rate of 10 per cent. per annum for the half year on the old ordinary stock, making, with the interim dividend paid in August last, 9 per cent. for the year (£19,419); to the payment of a dividend at the rate of 7 per cent. per annum for the half year on the stock under the Act of 1876, making, with the interim dividend, £6 6s. per cent. for the year (£11,200)—leaving £9210 to be carried forward. The quantity of water now in store is 3016 million gallons, out of an available storeage capacity of 3060 million gallons; so that the Company are in an excellent position to meet the demand for water during the present year. The gravitation works on the River Rede, the new filter-beds at Whittle Dean, and the line of the 30-inch pipes to Newcastle in connection therewith, the Directors remark, are all making satisfactory progress. To meet the expenditure on these and other works, it became necessary during the year to sell by auction a first instalment of £50,000 of the 5 per cent. preference stock created under the Act of 1889. In order that the Directors may issue the capital authorized to be raised on mortgage under the Acts of 1889 and 1890 in the form of debenture stock, the sanction of the shareholders has first to be obtained; and a special meeting has been called, immediately after the termination of the ordinary meeting, to be held on the 29th inst., for the purpose of passing the necessary resolutions.

At the meeting of the Woking Water and Gas Company to-day, the Directors will submit their report for the past half year and the accounts for the entire year. In the report, the shareholders are informed that the total expenditure to date on capital account has been £67,584. The revenue for the past year amounts to £4312, and the expenditure to £1758—leaving a balance to be carried to profit and loss account of £2554. The sum available for division is £1291, out of which the Directors recommend the payment of a dividend at the rate of 4 per cent. per annum for the half year, less income-tax, absorbing £1076; and, after writing a further sum of £100 off preliminary expenses, a balance of £115 will be left to be carried forward. The Directors regard with much satisfaction the increase in the revenue during the year, which enables them to recommend the payment of a dividend at the rate of 4 per cent. It is also mentioned in the report that the authorities of Frimley and Farnborough have been in correspondence with the Company in reference to a supply of water to their districts; and the Directors hope to come to some arrangement on favourable terms to the Company.

CAGLIARI GAS AND WATER COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Tuesday, at the London Offices, No. 3, Lothbury—Mr. JOHN AIRD, M.P., in the chair.

The SECRETARY (Mr. W. B. Peat) read the notice convening the meeting; and it was agreed to take as read the Directors' report and the accounts, an epitome of which was given in the JOURNAL last week (p. 298).

The CHAIRMAN, in moving the adoption of the report, said it was very gratifying to him and his colleagues that he was able to state that the Company were progressing very satisfactorily. The works were in a complete condition; and what they highly valued was the fact that they were working in unison and good-feeling with the authorities of the city which they had supplied with gas and water for the past 25 years. With regard to the water supply, during last year they had proceeded in the most satisfactory manner. The reservoirs, the filter-beds, and the mains had given them no trouble; and the private supplies had materially increased. They had laid in the course of the year 60 new services, producing an additional income of £327. Only recently the Syndic of Cagliari completed an analysis of the water which had been taken during the year; and, at a meeting of the Town Council, he had expressed the opinion that the water was of excellent quality. As to the expenses connected with the water supply, they were less last year than on any previous occasion; and at the same time the Board had continued to take those steps which they believed to be necessary in such undertakings as this—viz., not only to see that the reservoirs and filters were in proper order, but to deal every year with a mile of the main running from the reservoirs to the city, and have it thoroughly cleansed and kept free from extraneous matter. Passing on to the gas supply, he said perhaps it would be interesting to the shareholders to know that their Manager (Mr. Simmelkjör) had thought it desirable to meet—even in their comparatively small works—the difficulties which otherwise would have arisen in the labour market. By adopting machinery, he had materially lessened the cost of manufacture; and, in fact, they were assured, by his report, that during the past year he had, by the saving effected, returned to the Company the whole cost of the machinery. As to the general working, the illuminating power of the gas had been well maintained; 120 additional lights had been added; and the increase in the consumption of gas had been no less than 15 per cent. during the year. An effort had been made to introduce electric lighting into the Opera House at Cagliari; but after having spent a great deal of money, the authorities had thought it desirable to abandon that mode of lighting, and to welcome back the gas supply. The receipts for gas in the year had been increased by £1050, less £250 for the additional coal required. They had been making great efforts to push the use of gas-stoves, and to arrange for the sale and more rapid delivery of coke. To aid them in this matter, the post office authorities had, at the wish of the Manager, readily consented to pass letters on immediately when a supply was required; and this enabled deliveries to be made within six hours of their despatch. In Mr. Simmelkjör's report, he concluded thus: That our propaganda has been active and successful is proved by the accounts—viz., the coals cost us £2790 in round numbers, while the sale of the products rendered £2470; so that we get nearly 88 per cent. back of the cost of the coals from our residuals." This result, the Chairman thought, was the best possible proof he could offer to the shareholders of the successful working of the Company; and it might not be without some good purpose if these somewhat remarkable figures were circulated for the benefit, not only of other companies abroad, but of many at home. Before he left the subject of the gas supply, he might also mention that the unaccounted-for gas was only 4½ per cent. for the year. There was one other matter to which he wished to refer. The Directors had, in accordance with the wish of Mr. Simmelkjör, arranged with him that in the future he should give them the advantage of some of his time in London; and this would enable him to escape from Cagliari during the extremely hot weather. The Board believed this arrangement would be beneficial to the Company, and that it was necessary for Mr. Simmelkjör's health; for they could not forget how, during the past 25 years, he had laboured earnestly and continuously in the interests of the Company in Cagliari. They had, in consequence, thought it desirable to appoint Mr. Craig as his assistant; and this determination they had communicated to the Prefect of Cagliari, who had replied to the effect that he was quite sure Mr. Craig would carry on and maintain, in the transaction of business, that correctness and courtesy which so much distinguished Cavalier Simmelkjör, and promising not to neglect any opportunity, when in his power, of affording him his assistance. It was extremely gratifying to the Board that they should receive such testimony regarding their Manager, and to know that they might rely upon the support of the authorities of Cagliari in the future. In conclusion, the Chairman also testified to the admirable manner in which Mr. Peat performed his secretarial duties.

Mr. F. WIGAN seconded the motion.

Mr. NUGENT observed that last year there were two reserve funds—the special and the general—amounting together to £6400; and although it was stated in the report that a further £1000 had been transferred to reserve, there only appeared in the present accounts a sum of £6091.

The CHAIRMAN replied that last year a question regarding the sinking funds was raised by a shareholder, who thought (and the Directors agreed with him) that it was scarcely necessary to maintain the special reserve. The Board had, therefore, considered it desirable to transfer a certain amount of the special reserve to the sinking fund, which it would be seen had been increased, and to amalgamate the two reserve funds. The total figures in the present accounts under these two heads were £15,983; while last year the three funds only amounted to £13,477. The Company, he added, had now nearly £15,000 invested in 5 per cent. Italian stock; and close upon £4000 in The Gaslight and Coke Company's 4½ per cent. stock.

The motion was then carried.

The CHAIRMAN next proposed a resolution confirming the payment, in August last, of an interim dividend at the rate of 6 per cent. per annum, and declaring a dividend at the rate of 8 per cent. per annum for the half year ending December, and a bonus of 5s. per share.

Mr. WIGAN seconded the proposition, which was agreed to.

Mr. NUGENT then moved the re-election of the retiring Directors (Messrs. F. Wigan and J. Aird).

Mr. F. W. BLUNT seconded the motion, which was carried.

The Auditors (Messrs. H. Bishop and E. O. Coe) having been re-appointed, the proceedings terminated.

Barnet District Gas and Water Company.—The half-yearly general meeting of this Company is to be held next Friday, when the accounts which will be submitted for the six months ending Dec. 31 last will show a balance of £14,026 to the credit of the net revenue account. Out of this the Directors will recommend the declaration of a dividend (less income-tax) at the rate of 8 per cent. per annum on the "A" and "C" stock, 7 per cent. per annum on the "B" stock, and £5 12s. per cent. per annum on the "D" capital (water) shares. The Directors state that the Company's business continues to increase. The total gas revenue in the past half year was £8876; the receipts for water being £7438. The expenditure in the production of gas was £6298; in the supply of water, £2758.

Illegally Cutting Off a Gas Supply.—At the Barry Dock Police Court last Thursday week, Mr. I. T. Dando, of Cadoxton, summoned the Barry and Cadoxton Gas and Water Company for illegally cutting off his supply of gas. The statement made by Mr. A. Jackson, who appeared for the complainant, was to the effect that on Dec. 14, although all the gas bills due had been paid, the Company cut off his gas supply, and took away the meter, notwithstanding the fact that prosecutor showed the gas official the receipts. Mr. Hancock, for the Company, admitted that they had made an error, but said that an ample apology had been sent to Mr. Dando. The Bench said the action of the Company was a most extraordinary one; and they would have to pay £1 and costs.

THE BOARD OF TRADE REPORT ON THE GAS, &c., BILLS AND ORDERS OF THE PRESENT SESSION.

The Board of Trade report on the applications for Gas, Electric Lighting, and Water Bills and Provisional Orders for the present session has been issued. It shows that the number of Bills relating to the supply of gas is 19—all for England. Eight of these Bills also contain provisions in regard to the supply of water, while one has clauses referring to electric lighting. The capital proposed to be raised is £804,750—£247,000 by shares and £557,750 by loans. There are 24 Bills relating to the supply of water; four of them being Scotch. The total capital asked for is £8,643,150—£443,000 by shares and £8,200,150 by loans. Provisional Orders to the number of 15 have been applied for in respect of gas and water, and 32 in regard to electric lighting schemes. The capital proposed to be raised under these orders is: For gas supply, £132,500; for water, £160,000; for electric lighting, £1,211,103. As compared with last year, the number of Gas Bills has increased by three; that of Water Bills by two—the total for the two classes of Bills being now 43, as against 38 last year and 32 in 1890. The capital required for gas purposes is £480,824 more, and that for water purposes £6,545,748 more than last year. For Gas and Water Orders the capital proposed is £32,550 more, and for Electric Lighting Orders £913,987, less than last year. The applications for the last-named Orders show a very marked falling off—32 now, against 70 last year and 161 in 1890. The report contains, as usual, an analysis of the Bills and Orders; and a peculiar feature of it this year is the absence of Gas Bills relating to Scotland, and of both Gas and Water Bills for places in Ireland.

METROPOLIS WATER SUPPLY.

The Quality of the Water in January.

The returns furnished to the Registrar-General by the London Water Companies as to the water supply of the Metropolis during the past month, show that the average daily supply was 184,589,018 gallons, as compared with 192,454,640 gallons in the corresponding month of 1891; being at the rate of 30·3 gallons per head of the population. Of the entire bulk of water sent out, 92,617,596 gallons were drawn from the Thames, and 91,971,422 gallons from the Lea and other sources. Reporting upon the quality of the supply, Dr. E. Frankland said: "Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was: Kent, 1; East London (deep-well), 1·4; Tottenham, 1·6; Colne Valley, 2; Southwark and Lambeth, 3·6; New River, 3·8; Grand Junction, 4·3; East London, 4·4; Chelsea, 4·7; and West Middlesex, 4·9. The water abstracted from the Thames by the Chelsea Company was much inferior, as regards organic impurity, to that delivered by them in December. The water supplied by the other Thames Companies was, on the other hand, of much better quality in January than in December; the most marked improvement being observed in the water of the Southwark and Lambeth Companies. All these waters were efficiently filtered before delivery. The water taken chiefly from the Lea by the New River Company exhibited only a slight improvement over the December sample; while that sent out by the East London Company was not quite so good. Both these supplies were inferior to the best of the Thames waters. They were efficiently filtered before delivery. The deep-well waters of the Kent, Colne Valley, and East London Companies, and of the Tottenham Local Board of Health, were, as usual, of excellent quality for dietetic purposes; and the Colne Valley Company's water, having been softened before delivery, was rendered suitable for washing. All these waters were clear and bright without filtration. Seen through a stratum 2 feet deep, the deep-well waters were clear and colourless, and the river-derived waters clear and pale yellow. The bacteriological examination by Dr. Koch's process of gelatine plate culture gave the following results: One cubic centimetre of each water, collected on the same days as the samples for chemical analysis, developed the following numbers of colonies of microbes: Chelsea, 42; West Middlesex, 46; Grand Junction, 74; East London (river supply), 114; Lambeth, 176; New River, 196; Kent, 204; and Southwark, 830."

Messrs. Crookes, Odling, and Tidy, in the course of their report to the Official Water Examiner for the Metropolis (General A. de Courcy Scott) on the quality of the water supplied by the London Water Companies during the past month, as shown by samples taken daily for analysis, say: "Of the 182 samples examined, 179 were found to be clear, bright, and efficiently filtered; three being recorded as very slightly turbid. Except for the occurrence of these three instances of but very slight turbidity, the condition of the water supply to the Metropolis during the month of January was entirely satisfactory. Thus, taking the Thames-derived supply for comparison, the mean degree of colour-tint was found to be 12·4 : 20, as against 18·7 : 20; the mean amount of oxygen expended in oxidation to be 0·052 grain, as against 0·079 grain; and the mean amount of organic carbon to be 0·158 part in 100,000 parts, as against 0·240 part in the previous month's supply. Moreover, the maximum amount of organic carbon in any single sample examined was found to be reduced from 0·319 part in December to 0·204 part in January; the next highest amount recorded during the month being only 0·189 part in 100,000 parts of the water."

A New Filter Bed for the Farnham Water Supply.—The Farnham Water Company have just added to their works a new filter-bed for the purpose of removing the iron from the water, which has hitherto given a great deal of trouble. The new tank is of substantial construction, 60 ft. by 30 ft., and 6 ft. deep, made of cast-iron plates, bolted together and jointed with rust cement. The plans and specifications for the work were prepared by Mr. J. W. Lewis, the Company's Engineer.

PROPOSED NEW WATER-WORKS FOR SHREWSBURY.

The most important matter to come before the Shrewsbury Town Council at their last meeting was a report by the Gas, Water, and Lighting Committee on the question of supplementing and improving the water supply of the borough. Appended to the report was one by the Borough Surveyor, in which he dealt with the various schemes which have been proposed up to the present time. His report, the Committee stated, had so far commended itself to them as to make them desirous of obtaining the sanction of the Council to investigations and inquiries being made in order to enable them to thoroughly examine the question of a supply from the Stretton Hills, especially as to the estimated cost and the quality and sufficiency of the water. Without committing themselves further, they remarked that there was the strongest possible ground for believing that the quality of the water was unquestionable; and that the two points which required elucidation were the sufficiency of the supply and the cost at which it could be impounded and brought to Shrewsbury. The Borough Surveyor suggested that the cost of the investigations necessary to ascertain the practicability of the scheme would require £200 (exclusive of boring); and the Committee therefore asked permission to expend a sum not exceeding that amount. To prevent any misapprehension, they added that it should be borne in mind that the Stretton scheme now suggested by the Borough Surveyor had not hitherto been considered by the Council. The gathering-ground was formed by connecting two extensive valleys, the area of which was about 1500 acres. Considering its elevation, and the physical outline of the collecting area, the Committee were advised it should yield more than sufficient water for the borough, even with an increased population of 35,000 inhabitants, after allowing for compensation water. The adoption of the report was moved by Mr. Barker, and seconded by Alderman Herbert; and then Alderman Lloyd said that, as Chairman of the Finance Committee, he felt that it was incumbent upon him to draw their attention to the figures he was about to submit to them, for it was no use granting any sum of money if they were afraid of adopting the scheme, if suitable, at last. The data he would submit was very imperfect; but perhaps it would be the means of guiding them in any decision they might arrive at. Mr. Baldwin Latham had told them that the Church Pulverbatch scheme would cost £60,000, and that the Church Stretton scheme would cost more than that. If they presumed that the Stretton scheme would be carried out for £80,000, then, according to the Borough Surveyor, £20,000 would be required for the fittings in the borough. This would make £100,000; and there was the present debt of £30,000, which brought the total up to £130,000. The interest on this sum at 3½ per cent. would reach £4550 a year. They might be allowed to borrow money for fifty years; but thirty years was generally the time allowed. It would not, however, be like borrowing money on machinery, which would be liable to get out of repair, and possibly they would get the money for fifty years. This would necessitate a repayment, together with the annual expenses, of £7900 a year. The present income for water was 6 per cent. on the rentals, bringing in £5000 a year. To meet the expense of £7900 a year, they would have to increase the 6 per cent. to 10 per cent.—that was, if the money had to be repaid in 50 years; but if they could not obtain it for that period, but only for 30 years, the annual amount would be £9600—almost 12 per cent. on the rentals. The Council would have to consider whether the borough was likely to stand the expense of such a scheme. This was a serious question; and he thought the price they would have to pay would be almost prohibitive. There was a protracted discussion on the question—the speakers appearing generally in favour of the scheme; and the report was adopted *nem. con.*

The Richmond Well.—The well-sinking operations which are being carried out by the Corporation of Richmond (Surrey) in the Terrace Gardens in that town are proceeding satisfactorily. According to the last report presented by the Water-Works Engineer (Mr. W. Peirce), the length of adit driven in the direction of the well at the Corporation's water-works is now 1003 feet; leaving 1317 feet still to be driven. The total length of adits completed is 1836 feet. Two further fissures have lately been passed; yielding together about 11,000 gallons of water per diem. The average daily yield of the Terrace Gardens well is now 119,111 gallons.

The New Water Scheme for Mansfield.—The Mansfield Town Council last Friday week had under consideration the new project for obtaining a supply of water from Rainsworth at a cost of £20,000. A memorial was first read from the Ratepayers' Association in opposition to the scheme. In this it was pointed out that at Rainsworth the water supply would be imperilled owing to the probability of coal being worked there; and the memorialists were satisfied that, by sinking near the present works, a sufficient supply could be procured to last for many years to come, at a cost not exceeding £10,000. The minutes of the Water Committee were next presented; and these contained a recommendation that various alterations should be made in the scheme, whereby its cost might be reduced to £18,000. After a short discussion, it was agreed to postpone the minutes for further discussion.

Gas, Water, and General Investment Trust, Limited.—In the report which the Directors of this Company will present to the proprietors at their ordinary general meeting on Friday next, they state that, after debiting the revenue account with all expenses, and adding thereto the sum of £2539 brought forward, there remains a balance of £31,291, out of which interim dividends at the rates of 4½ and 5 per cent. per annum on the preferred and deferred stocks respectively, amounting to £11,779, were paid in August last. The Directors now propose to pay further dividends at the rate of 4½ per cent. per annum on the preferred stock, and at the rate of 10 per cent. per annum on the deferred stock, for the half year ending the 28th ult.; making for the year 4½ and 7½ per cent. respectively for the two classes of stock. This will absorb £18,291, and leave a balance of £1221 to be carried forward. The reserve fund has been raised to £64,341 by the addition of £11,070; and, in the Directors' judgment, this amount is sufficient for all eventualities.

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

What threatened to be a wide-spread dispute in the coal trade has fortunately terminated without the dreaded event taking place. This is in itself good news, for a stoppage of the coal supply is attended by consequences more dire, perhaps, than that of any other commodity within the range of striking probability. But the circumstances of the threatened dispute and settlement are of quite as much importance as the fact itself. Like many other similar movements, it arose over a very small matter. The Earl of Rosslyn is owner of one or two coal pits at Dysart, in Fifeshire, regarding which, a month or two ago, an outcry was raised by men working in other collieries—members of the Union to boot—that the wages paid were a shilling a week below the standard rate. On being appealed to, Lord Rosslyn pointed out that, owing to the thickness of the seams in his pits, men were able to earn as much at the low rate of wages as they did at the high rate in most other pits; that men sometimes left his pits to get higher wages elsewhere, but his experience was that they were always glad to get back to his employment; and he refused to give an advance. Thereafter the Union camp began to prepare for a struggle. The Dysart men were ordered by the Union to strike; and they were promised that they would be supported. They came out ten weeks ago. A counter-move was then made by the employers, in the shape of an intimation of a general reduction of 15 per cent. This, of course, was resisted by the men, who, however, were willing to accept a 7½ per cent. reduction. The masters were agreeable to modify the reduction to that figure upon condition that the Dysart men should resume work at once. To that offer, however, the men replied by lodging their notices to cease work on Tuesday of this week. The masters then announced that, irrespective of the Dysart affair, they would enforce a 7½ per cent. reduction. A ballot was taken among the men at the end of last week. to determine whether or not they should proceed with the strike; and they resolved, by 302 out of a vote of 4304, to accept the masters' terms. When Tuesday came, therefore, work went on as usual. But the Dysart men were still out; and eviction notices to quit their dwellings had been served upon them. These poor men had been taken from their work by the Union, and a general strike was being organized in their interest; but the whole affair crumbled to pieces when the question came to be a personal one with each individual miner. It is impossible to blame the miners for displaying self-interest in the matter of quashing the strike proposal; but one cannot too strongly condemn their policy in moving the Dysart men to strike, and then leaving them in the lurch. There was nothing left for the Dysart men but to surrender and go back to work, which they did yesterday; and then the eviction notices were withdrawn. In this incipient struggle, the familiar feature was presented of an employer fighting, not his own men, but men at a distance and over whom he had no control—a policy which has its rise deep down in the human instinct which prompts the feeling that if disagreeable work has to be done, somebody else had better do it and not yourself. The action of the masters was wisely directed, not against the Dysart men, but the great body of men who were making them their tools. The incident presents a highly instructive contrast. The Democratic spirit—the spirit of progress, so called—ranged itself to do battle with a privileged and grasping aristocracy. It forced an innocent party to pick a quarrel and to relinquish its livelihood, upon a pretext of principle; and then, for a monetary consideration, threw principle to the wind and left the innocents at the mercy of the aristocrat. Viewed in that light, there can only be satisfaction that the meanness of Unionism did not in the end lead to a triumph, and that the honourable dealing of the master did.

I recently mentioned that the Hamilton Corporation Gas Committee had important extensions of the local gas-works in contemplation; and I am now in a position to say that the consulting gas engineer to whom the matter was referred, has prepared a report in which he recommends what the Committee should do for the future wants of the burgh and its suburbs in respect of gas supply. The gentleman in question is Mr. A. Gillespie, of the late firm of Laidlaw, Sons, and Caine, who superintended the reconstruction of the two "exploded" holders at the Dawsholm gas-works of the Glasgow Corporation. As regards the Hamilton Gas-Works, I may say that Mr. Gillespie recommends the entire "disestablishment" of the ordinary retorts now in use; and the substitution for them of retorts set on the regenerative system which has been devised and has been so successfully worked out at the Paisley Corporation Gas-Works by Mr. G. R. Hislop. He considers that the retort-house is capacious enough to admit of eighty retorts on Mr. Hislop's setting. His most important recommendation, perhaps, is that a new gasholder should be erected at or near the works, of much larger capacity than any holder in the county of Lanark. He advises that it should be 120 feet in diameter, and consist of two lifts of 28 feet each. These figures mean, I believe, that its capacity should be between 400,000 and 500,000 cubic feet. It is very probable that the Gas Committee will shortly give a deliverance on the recommendations made to them by Mr. Gillespie.

If the example of the School Board of Glasgow is followed at all generally, there will be a large demand for gas-engines for driving mechanical ventilators on the principle adopted by Mr. William Key in the Victoria Infirmary, Glasgow, and by Mr. Cunningham, of Dundee, in Board Schools in that city and in Aberdeen. The Glasgow School Board have two new schools in progress, in which gas-engines of 4-horse power are to be installed in due course; and additions are being made to two other schools for which engines of 1½-horse power are wanted.

At the last monthly meeting of the Rothesay Town Council, there were submitted the Gas Committee's and Manager's reports, which showed that there had been an increase in the quantity of gas made amounting to 13 per cent., which was accou nted for by the unusual darkness of the weather during the month of January. Mr. Fisher suggested that in the Manager's monthly report there might in future be given the average cost of the coal used, the average amount of gas produced from it, and the average cost per ton for carbonizing the coal. By doing so, they would see what the coal was producing. He only threw out the suggestion then; and he hoped that the Convener would take it up later on.

The development of the oil-gas method of lighting railway carriages has been very rapid. The industry is still a growing one. In Scotland, the Caledonian Railway Company already use it almost over their entire system. They have evidently found it to be the most profitable of all existing modes of illumination, for they are about to erect a manufacturing station in connection with their Edinburgh terminus. Hitherto, they have been in the habit of carrying gas under compression from Glasgow to Edinburgh in a specially-constructed tank; but the process of charging the reservoirs in the carriages from it was not so satisfactory as could be desired. They have consequently applied for and obtained permission from the Dean of Guild Court of Edinburgh to erect an oil-gas works. The works are to be accommodated in a building 82 feet long by 26 feet wide. The Law Agent of the Company assured the Bench that there would be no smell of an offensive nature from the works, and that the Company would take the risk of nuisance being created by them.

The Glasgow Alum and Ammonia Company have got among the breakers with a vengeance. The action which I mentioned a fortnight ago as having been instituted against them by the Dundee Gas Commissioners, to recover an account due for residuals, was not defended by them; and decree in absence was granted by Lord Stormonth Darling on Tuesday. The Commissioners were just in time to secure a preference over other creditors, for next day two petitions relating to the Company were presented to the First Division of the Court of Session. The first was by the Barrhead Gaslight Company, that the Alum Company should be wound up; and the other petition was by the Alum Company itself, and asked that the Company should be wound up under supervision of the Court. Both petitions were ordered to be intimated to the parties concerned, and to be advertised.

The municipal deputations from Glasgow to London have begun unusually soon this season; and there are a number of questions not involved in Parliamentary Bills which have drawn deputations to the Metropolis this week. One of them has reference to electric lighting, both central stations and in the public street lamps; and the members of it (who have been away from home most of the week) include Mr. Ure, practically the chief of the Gas and Electric Lighting Committee; Mr. James Bell, Convener of the Sub-Committee on Electric Lighting; Mr. Foulis, the Gas Engineer; Mr. Arnot, the Electrical Engineer; and Mr. Bowers, the Assistant Town Clerk, who looks after the gas and electric light affairs. By the way, I should also like to mention Mr. R. Hamilton, the Inspector of Public Lighting—a thoroughly practical man in his own department of municipal work. He has returned; and possibly he has brought home with him some "wrinkles" which may be turned to account in the course of the next few months when street lighting by electricity begins to take shape in this city, as resolved on some weeks since by the Watching and Lighting Committee of the Police Board, in conjunction with the Gas and Electric Lighting Committee.

Electric lighting, or rather the establishment of it, makes slow progress in Aberdeen. It is now a year since the Gas Committee, who have charge of the subject, collected very complete information as to the patronage they would receive if they started an installation, and made inquiries into the cost. Apparently, they are yet unable to make up their minds to go in for the expenditure, for this week they appointed a Sub-Committee to collect information upon what other corporations are doing in the matter. Meantime, half of the three years allowed by their Provisional Order for the completion of an installation, has expired. If the Committee go on making inquiries in the leisurely fashion they have been doing, the time will expire without anything being done.

The terms of the settlement between the Falkirk and Larbert Water Trustees and Messrs. D. Y. Stewart and Co., of Glasgow, the contractors for the work of constructing the new water-works, as given in last week's "Notes," were altogether in favour of the Trustees, and might be read in an unfavourable light towards Messrs. Stewart. It is right, however, to state that at a meeting of the Water Trust, at which the settlement was confirmed, Provost Watson said they never believed that a knowledge of the state of the works was ever in the possession of the contractors, who, they thought, were a thoroughly honest firm.

Gas Exhibition in Carlisle.—Last Tuesday afternoon Mr. Richard Forster, the Chairman of the Carlisle Corporation Gas Committee, opened, in the City Hall, an exhibition of gas cooking-stoves, gas-heaters, gas-fires, and gas cooking-utensils, the productions of Messrs. Richmond and Co., Limited, of Warrington and London. There was a large attendance, consisting principally of ladies. Mr. Forster, before opening the exhibition, referred to the success of previous similar undertakings in Carlisle, and expressed a hope that the present one would also be prosperous. There had been a good demand in Carlisle for cooking-stoves and gas-fires. Recently he found that there were 34 gas-engines in the City, 487 cooking-stoves, 711 heating-stoves, 104 water-heaters, and 287 boilers, all using gas. In seconding a vote of thanks to Mr. Forster, Mr. J. Hepworth, the Gas Engineer, observed that everything that the Gas Committee did to promote the consumption of gas and the use of appliances entailed more work upon them; but they were interested in increasing the comforts of life, and they believed they were doing something in that direction. The figures which had been quoted by the Chairman were not quite accurate; the number of appliances having increased since they were supplied. As a matter of fact, one consumer in every twelve in Carlisle cooked with gas; but he thought there were towns which had gone further in that direction. If he mistook not, in the town of Leicester one consumer in every six used a cooker; and he believed that in Carlisle there was room for about 500 more than were used at present. The Gas Committee did everything they could to facilitate the convenience of persons in the matter, and had introduced a new departure lately. In addition to letting out ordinary cookers, they had undertaken to hire out the large ranges then exhibited in the room. The motion was carried, and Mr. Forster acknowledged the compliment. Miss Golding, of London, proceeded to deliver the first of a series of cookery lectures which she intended to give twice a day till the close of the exhibition.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 20.

Sulphate of Ammonia.—The transactions are entirely confined to the dealers, who are picking up the parcels offering in execution of their previous sales. New business is restrained by the manœuvres of the speculators, who, refusing to allow the market to recover for motives of their own, are making quotations here and abroad, which lead consumers to the conclusion of a falling market; and the latter therefore abstain from buying. It is unlikely that anybody would boldly make the statement that the season's demand is over; but it is no doubt attempted to create such an impression. It is, however, best to let facts speak for themselves; and as almost every parcel placed on the market is readily picked up, the question of demand requires no further discussion. It is immaterial whether the buyer is consumer or speculator. The quotations at Hull are down to £10 7s. 6d. The price is the same at Leith, where, however, £10 10s. has been paid for March delivery. At Liverpool not more than £10 5s. is obtainable for ordinary makes. The return of wintry weather is no doubt keeping many orders back at present; but an active demand may now be expected at any moment, especially if milder weather should set in again. Nitrate is rather dull at 9s. 6d. per cwt.; but it is too soon to gauge the spring requirements of this commodity.

LONDON, *Feb.* 20.

Tar Products.—Pitch is moving off freely; and there is a good deal of inquiry for forward delivery, though the prices mentioned are considerably lower than to-day's quotation. Manufacturers complain of the slackness in demand for other products. Benzol is fairly firm; but buyers are shy of buying forward at the prices asked by makers. Considerable business is being done in solvent naphtha for the ensuing season's delivery; and it is likely to maintain its value. There is more inquiry for carbolic acid of high quality. The lessened production, owing to it being unprofitable to extract excepting in the best arranged works, should bring about an improvement in the value. No business appears to be doing in anthracene; and there is absolutely no inquiry for creosote and common oils. The following prices represent business done during the week: Tar, 17s. 6d. Pitch, 32s. 6d. Benzol, 90's, 2s. 6d.; 50's, 1s. 9d. Toluol, 1s. 5d. Solvent naphtha, 1s. 3½d. Crude benzol naphtha, 30 per cent., 1s. Creosote, 1d. Crude naphthalene, 25s.; hot pressed, 42s. 6d. Crude carbolic acid, 60's, 1s. 1½d.; 70's, 1s. 4½d.; crystals, 5½d. Cresol, 8½d. Anthracene, 30 per cent., "A" quality, 1s.; "B," 8d.

Sulphate of Ammonia.—This market continues dull; and very little business is reported. Price does not improve, nor is it likely to do so when makers are compelled to sell to market operators. Sales have been reported at prices ranging from £10 to £10 7s. 6d., less 3½ per cent., according to position, conditions, and delivery. Gas liquor, 10-oz., is quoted at 6s. 6d. to 8s.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The threatened stoppage of the collieries in the Lancashire and other districts, in accordance with the resolution passed at the miners' conference held in Manchester, with a view of preventing any further reduction in wages, has necessarily been the principal topic of conversation in the coal trade during the past week. But although there has been some increased inquiry with a view of getting in extra supplies in anticipation of the cessation of work, there has been no great anxiety on the part of consumers as to the future, and no general pressure of demand upon the markets. With regard to gas-works, it has been necessary to make arrangements for securing requisite supplies in the event of the decision of the conference being carried into effect; and for engine classes of fuel there has been a fairly active inquiry, with colliery proprietors, in some cases, holding votes for slight advances upon late rates. Apart from this, however, the market has not been affected to any material extent; and the general impression is that, considering the very partial representation at the conference—no delegates being present from Northumberland, Durham, and South Wales, and only one from a comparatively small district in Scotland—any stoppage of work will be similarly partial in character, and not of any prolonged duration. Indeed, the miners' delegates themselves, in deciding to hold a second conference immediately after the notices have been sent in, to consider what further course of action shall be taken, have certainly shown a want of confidence in the success of the line they are just now pursuing. The return of severe weather has necessarily made the demand brisk for house-fire coals; and these are firm at late rates. Best Wigan Arley averages 12s. 6d. per ton; Pemberton four-feet and second qualities of Arley, 10s. 6d. to 11s. per ton; and common house-fire coals, 9s. to 9s. 6d. per ton. At the pit's mouth, steam and forge coals average 8s. to 8s. 6d. per ton; while for shipment, good qualities of steam coals are readily obtainable at about 10s. to 10s. 6d. per ton, delivered at the ports on the Mersey. For engine classes of fuel, as already stated, prices have slightly stiffened, but not more than to the extent of 3d. and 6d. per ton; and this has only represented a levelling up of prices, which were previously low. At the pit's mouth, Burgy does not average more than 6s. 3d. to 6s. 9d. per ton; best slack, 5s. 3d. to 5s. 9d. per ton—lower classes ranging, according to quality, from 3s. 6d. to 4s. 6d. at the pit's mouth.

Northern Coal Trade.—The northern coal trade has in the past few days experienced a fuller inquiry; and a little more life has been seen in it, because of the dread of stoppages, which has caused some consumers to buy more largely. There has been an abundance of coal; and this has allowed the stocking on the part of consumers to be begun, and the coal to be secured at a low price. Best Northumbrian steam coal has been sold as low as 9s. 6d. per ton, free on board; but the current rate is higher than that, and may be said to be from 9s. 9d. to 10s. per ton. Small steam coal is very abundant, and sells as low as 3s. 6d. per ton. Gas coal is in a little stronger demand, owing to the desire of the gas companies to have larger stocks than usual; but the prices have varied very greatly. It is said that as low as 8s. per ton, free on board, has been taken for best Durham gas coal, and from this figure up to 8s. 9d. prices have varied. Some contracts for delivery abroad over the season have been concluded—the price depending upon the rate allowed for the sea freight; but, generally speaking, it may be looked upon as from 8s. to 8s. 4½d. There has been an ample supply of bunker coal; and the price is lower than it has been for years. Manufacturing coal is in very full supply; the engineers on strike on the Tyne having thrown considerable quantities of fuel on the market. Coke is rather steadier generally. Best blast-furnace qualities are about 16s. per ton, free on board. Gas coke is only quiet; but it has probably reached its lowest price for the present.

West of Scotland.—Matters do not improve in the Glasgow coal trade; and, compared with the close of the week ending Feb. 13, the demand is poorer, and prices are 3d. lower. Although the shipments for this year are 156,000 tons in excess of a similar time in 1891, this does not mean that the demand is better, as the figures were going against the railway strike period. Coal is generally plentiful, and some pits are not going full time. Nuts are specially abundant, and consequently the price is easy. Main has ruled at 7s. 9d., although 7s. 6d. per ton f.o.b. was done. Splint is also 3d. down; 9s. being the general price. Steam is given at late prices—10s. to 10s. 3d. Ell has benefited from the cold weather, and has commanded up to 8s. 9d. per ton.

Improvements at the Colchester Water-Works.—At the last meeting of the Colchester Town Council, Mr. Paxman moved a resolution, empowering the Water Committee to provide new pumping machinery. He stated that the present machinery was very old and inadequate for the quantity of water which the Committee had to distribute; and new plant should be put down without delay. It was estimated that the total cost would be £13,000; but the Engineer was hopeful of getting the work done for £10,000. The well, which had cost from £1500 to £1600, had been paid for out of revenue; and it was the intention of the Committee, if possible, to meet some of the proposed outlay in the same manner. The resolution was agreed to.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 333.)

Issue.	Share	When ex-Dividend.	Dividend or Last Bonus.	NAME	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	15 Oct.	10½	Alliance & Dublin 10 p. c.	10	16–17	..	6 3 6
100,000	10	,,	7½	Do. 7 p.c	10	11¼–12½	..	6 0 0
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	105–107	..	4 13 5
100,000	20	27 Nov.	8	Bahia, Limited	20	12–14	..	11 8 6
200,000	5	12 Nov.	7½	Bombay, Limited	5	6⅞–7	..	5 7 1
40,000	5	,,	7½	Do. New	4	4¾–5¼	..	5 14 1
380,000	Stck.	13 Aug.	12½	Brentford Consolidated	100	210–220	..	5 11 4
150,000	,,	,,	9½	Do. New	100	157–162	..	5 14 2
220,000	20	16 Sept	11½	Brighton & Hove Original	20	40–42	..	5 9 6
888,500	Stck.	16 Sept.	5	Bristol	100	98–103	..	4 17 1
320,000	20	15 Oct.	11½	British	20	43–45	..	5 0 0
50,000	10	28 Aug.	11½	Bromley, Ordinary 10 p. c.	10	18–20	..	5 15 0
51,510	10	,,	8¼	Do. 7 p. c.	10	13–15	..	5 13 4
328,750	10	—	—	Buenos Ayres (New) Limited	10	5–6	–½	—
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	93–96	..	6 5 0
150,000	20	13 Aug.	8	Cagliari, Limited	20	25–27	..	5 18 6
550,000	Stck.	15 Oct.	13⅝	Commercial, Old Stock	100	240–250	..	5 10 0
765,000	,,	,,	10⅝	Do. New do.	100	190–195	..	5 10 3
130,000	,,	30 Dec.	4½	Do. 4½ p. c. Deb. do.	100	118–123	..	3 13 2
800,000	Stck.	30 Dec.	13	Continental Union, Limited	100	225–230	..	5 13 0
200,000	,,	,,	10	Do. 7 p. c. Pref	100	185–195	..	5 2 7
75,000	Stck.	16 Sept.	10	Crystal Palace District	100	190–200	..	5 0 0
486,090	10	29 Jan.	10	European, Limited	10	19–20*	..	5 0 0
354,060	10	,,	10	Do. Partly paid	10	14–15*	..	5 0 0
5,470,820	Stck.	12 Feb.	12	Gaslight & Coke, A, Ordinary	100	274–278*	–1	5 10 1
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	94–97 *	..	4 2 5
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	245–250*	..	4 0 0
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	116–121*	..	4 2 9
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	169–174*	..	4 6 2
1,300,000	,,	,,	7	Do. H, 7 p. c. max	100	148–153*	+½	4 11 6
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	241–246*	..	4 1 3
476,000	,,	,,	—	Do. K, 6 p. c. Prf.	100	145–150*	..	4 0 0
1,061,150	,,	11 Dec.	4	Do. 4 p. c. Deb. Stk.	100	112–115	..	3 9 7
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	118–123	..	3 13 2
908,000	,,	,,	6	Do. 6 p. c. do	100	163–168	+3	3 11 5
3,800,000	Stck.	12 Nov.	12	Imperial Continental	100	221–224	–1½	5 7 2
75,000	5	26 June	6	Malta & Mediterranean, Ltd.	5	4–4¼	..	6 13 4
560,000	100	1 Oct.	5	Met. of Melbourne, 5p. c. Deb.	100	108–110	..	4 10 11
541,920	20	27 Nov.	6¼	Monte Video, Limited	20	15–16	..	8 2 6
150,000	5	27 Nov.	10	Oriental, Limited	5	8¾–9	..	5 11 1
60,000	5	30 Sept.	7	Ottoman, Limited	5	4–5	..	7 0 0
166,870	10	26 Feb.	2	Pará Limited	10	2½–3½	..	—
				People's Gas of Chicago—				
420,000	100	3 Nov.	6	1st Mtg. Bds.	100	100–105	..	5 14 3
500,000	100	1 Dec.	6	2nd Do.	100	100–105	..	5 14 3
150,000	10	15 Oct.	10	San Paulo, Limited	10	9½–10½	–½	9 10 6
500,000	Stck.	28 Aug.	15½	South Metropolitan, A Stock	100	272–277	..	5 11 11
1,350,000	,,	,,	12	Do. B do.	100	226–231	+1	5 3 11
200,000	,,	,,	13	Do. C do.	100	238–243	..	5 7 0
725,000	,,	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	138–143	..	3 10 0
600,000	Stck.	16 Sept.	11½	Tottenham & Edm'nton, Orig.	100	—	..	—
				WATER COMPANIES.				
729,331	Stck.	30 Dec.	10	Chelsea, Ordinary	100	256–261	..	3 16 7
1,720,560	Stck.	15 Oct.	8	East London, Ordinary	100	204–209	..	3 16 7
544,440	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	130–140	..	3 4 3
700,000	50	11 Dec.	8	Grand Junction	50	99–103	–1	3 17 8
708,000	Stck.	12 Feb.	10½	Kent	100	263–268*	..	3 18 4
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	225–230	..	4 2 7
406,200	100	,,	7½	Do. 7½ p. c. max.	100	189–194	..	3 17 4
260,000	Stck.	30 Sept.	4	Do. 4 p. c. Deb. Stk.	100	120–123	..	3 5 4
500,000	100	12 Feb.	12½	New River, New Shares	100	330–340*	..	3 13 4
1,000,000	Stck.	29 Jan.	4	Do. 4 p. c. Deb. Stk	100	123–126*	..	3 3 6
902,300	Stck.	30 Dec.	6½	S'thwk & V'xhall, 10 p. c. max.	100	146–150	..	4 6 8
126,500	100	,,	6½	Do. D 7½ p. c. do.	100	140–145	..	4 9 0
1,155,066	Stck.	11 Dec.	10	West Middlesex	100	245–250	..	4 0 0
						*Ex div.		

The Darlington Gas Exhibition.—The exhibition of gas cooking-stoves, &c., by Messrs. Richmond and Co., Limited, of Warrington and London, which was opened in the Corn Exchange, Darlington, on the 9th inst., as mentioned in the JOURNAL last week, was brought to a close on the following Friday by a dinner to the Mayor and Corporation. It was prepared by Madame Gothard, who gave a series of lectures on cookery during the continuance of the exhibition; and it was served in the hall. Mr. E. W. T. Richmond presided; the Mayor (Mr. Alderman Thompson) being in the vice-chair. The event brought to a pleasant ending a very successful exhibition.

Cork Gas Consumers' Company.—The ordinary general meeting of this Company was held last Thursday, when the Directors reported a satisfactory increase in sales of gas in the half year ending Dec. 31 last, as compared with the corresponding period of 1890. The income from private lighting improved by £692; and that from public lighting by £40. These made about 4 per cent.—being more than the Company had experienced for several years; and the Directors believed this progress would be maintained or increased in the future. The cost of coal was higher, and the return from residual products did not equal that of the corresponding period; both coke and sulphate of ammonia being lower in price. As the shareholders were informed in the previous report, the Directors gave the Cork Corporation notice of their intention to apply for a Provisional Order, enabling them to supply electric light in the city. The Corporation, without giving any reasons, refused their assent. Although the Directors consider such assent is not legally necessary, they have deemed it wiser for the present not to take any further steps to obtain an Order this session. The balance of the profit and loss account is £6306, out of which a dividend at the rate of 8 per cent. was recommended. This would absorb £5701, and allow £605 to be added to reserve, making this fund £12,494. The report was adopted.

Fatal Accident at the Stafford Gas-Works.—Last Tuesday morning an accident took place at the Stafford Corporation Gas-Works, which resulted in the almost instant death of Frank Ward, a shunter. The gas-works have recently been connected with the Great Northern Railway by a branch line for the conveyance of coal and other material into the works; and though the branch is completed, it is not yet considered sufficiently set to allow the heavy engines of the Railway Company to pass over it. In order, however, that the line may be used, a system of horse shunting has been adopted; and while at his ordinary work on Tuesday morning, with two horses, the unfortunate man Ward met with his death. He was in the act of conveying a heavily-laden truck of coal into the works, and had just unhooked the horses from it while in motion, when he is supposed to have slipped; and in his endeavour to right himself again, by some means got between the laden truck and two empty ones standing on the line, and was literally crushed to death by the buffers. On Wednesday an inquest was held on the body. Evidence was given showing that Ward had the horses chained in front of the truck instead of at the side, which would have been a safer method, and to some extent he had thus contributed to the accident. He was said to be a steady man. The jury returned a verdict of "Accidental death." Alderman W. Peach, the Chairman of the Gas Committee, attended the inquest, and expressed his regret and that of his colleagues at the sad accident, and intimated that he would make every effort to induce the Council to assist the unfortunate man's widow and family (five children).

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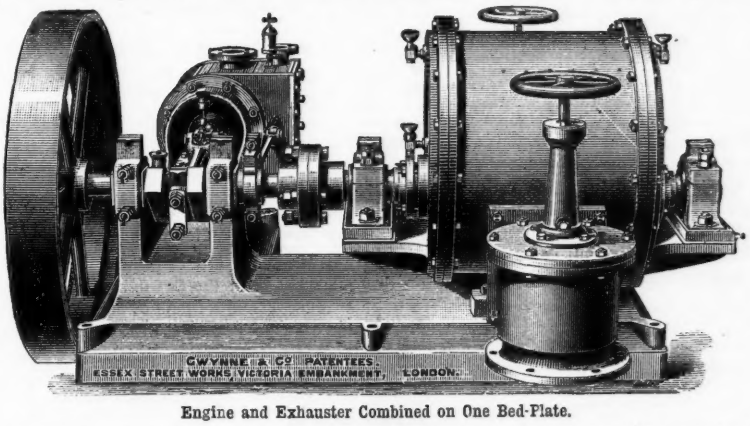

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5000 6 per cent. Preference Shares of £10 each (cumulative and with priority in respect of Capital as well as Dividends)	£50,000
10,000 Ordinary Shares of £10 each	100,000
	£150,000

(Of the Ordinary Shares 7000 only will be the first issue.)

In addition to which 500 Debentures of £100 each, bearing interest at the rate of 5 per cent. per annum, will be issued	£50,000

The Debentures will be secured by a first charge on the real and leasehold property of the Company situate at Warrington and Pendleton, and will be a first floating charge on all the undertakings and assets of the Company, including its uncalled Capital for the time being, and will be repayable at par on the 1st day of March, 1903, or at the option of the Company at an earlier date, subject to six months' notice, upon payment of a premium of 5 per cent. Interest will be payable half yearly, on the 31st day of August and the last day of February in each year.

The Vendors will take 3100 Preference Shares as fully paid up, and 3800 Ordinary as fully paid up, and Debentures for £31,000 in part payment of the purchase-money.

The remainder of the first issue of the Shares and Debentures are now offered for Public Subscription, viz.:—

1900 6 per cent. Preference Shares of £10 each	£19,000
3200 Ordinary Shares of £10 each	32,000
And 190 Debentures of £100 each	19,000
	£70,000

Which will be payable as follows, viz.:—

	Preference Shares.	Ordinary Shares.	Debentures.
On Application	£2 0 0	£2 0 0	£10 per cent.
On Allotment	3 0 0	3 0 0	40 „
Two Months after Allotment	2 10 0	2 10 0	25 „
Three Months after Allotment	2 10 0	..	25 „
	£10 0 0	£7 10 0	£100

The remaining £2 10s. uncalled upon the Ordinary Shares shall not be called within three months after date of the last-named payment, nor upon less than fourteen days' notice.

The Debentures and Preference Shares may be paid up in full on allotment, or at the due date of any other instalment, and interest will be allowed from the date of actual payment in respect of such portion thereof as may be for the time being in advance of the date of payment. This also applies to any instalment falling due as above mentioned on the Ordinary Shares.

Directors.

*THOMAS WILLIAM FLETCHER, Esq., F.C.S., Grappenhall House, Grappenhall, Warrington (Chairman).
*ALFRED CLARE, Esq., Ivy Mount, Latchford, Warrington.
*WILLIAM RUSSELL, Esq., Carron Vale, Pendleton, Manchester.
*ALEXANDER COCKBURN RUSSELL, Esq., Kelvin Dale, Pendleton, Manchester.
*ALEXANDER NEIL, Esq., Belgrade House, Pendleton, Manchester.
ROUGHSEDGE WALLWORK, Esq., The Manor House, Woodley.

* A Member of one of the Vendor firms.

Bankers.

THE MANCHESTER AND LIVERPOOL DISTRICT BANKING CO., LIMITED, Manchester and Branches.
(London Office: 75, Cornhill, E.C.)
THE LANCASHIRE AND YORKSHIRE BANK, LIMITED, Manchester and Branches.
London Agents: ALLIANCE BANK, LIMITED, Bartholomew Lane, E.C.

Solicitors.

MESSRS. PERCY DAVIES and FORSHAW, King Street, Warrington.

Auditors.

MESSRS. THOMAS, WADE, GUTHRIE, and CO., 71, King Street, Manchester.

Secretary.

MR. JOHN NEIL, Scotia Foundry, Pendleton, Manchester.

Registered Office.

Thynne Street, Warrington.

PROSPECTUS.

This Company is formed for the purpose of acquiring and working, as one concern, the two businesses now carried on in Warrington, Pendleton, and elsewhere, respectively by the well-known firms of Thomas Fletcher and Co. and W. & A. C. Russell and Co., as Gas Engineers and Artistic and General Ironfounders.

The businesses comprise the manufacture of Ornamental Stoves, Ranges, and Gas Heating-Apparatus, Iron, Metal, and Artistic Founding, Artistic Enamelling, and Dental Manufacturing, &c., and have been carried on at large and commodious premises, situate in Warrington and Pendleton aforesaid, by the said respective firms, for the last sixteen years.

Together with the businesses the Company will acquire the following properties, namely:—

(1) The Leasehold Lands, Works, and Buildings situate in Museum Street and Thynne Street, Warrington, now held on lease as to one portion for the term of 990 years, from the 29th day of September, 1880, at the yearly rent of £31 17s. 11d.; as to another portion for the term of 990 years, from the 29th day of September, 1881, at the yearly rent of £22 5s. 7d.; as to another portion for the term of 987 years, from the 29th day of September, 1884, at the yearly rent of £46 8s.; and occupying in the whole an area of 5075 superficial square yards, or thereabouts.

(2) All the Freehold Lands, Works, and Buildings known as Scotia Foundry, Pendleton, together with the 22 Messuages or Dwelling-Houses (two whereof are used as Shops), and subject as to one portion of the property to an annual chief rent of £40, and also subject to the covenants and conditions in certain indentures contained, which lands comprise in the whole 16,090 5-6ths superficial square yards, or thereabouts.

Also the Steam-Engines, Steam-Boilers, Shafting, Gearing, Machinery, Plant, Tools, Patterns, Stock-in-Trade, Furniture, and Fixtures now used or employed in connection with the said businesses, and valued by Messrs. Wheatley Kirk, Price, and Goulty, of Manchester, as at the 31st of August, 1891, at together (including Lands and Buildings) £88,751 3s.; and the book and other debts, and the benefit of all contracts and engagements subsisting in the said businesses on the 31st of August, 1891.

FLETCHER, RUSSELL, & Co., Limited.

The Company will also take over, as from the 31st of August, 1891, the Leases of the Warehouse, Tenement Buildings, and Premises occupied by Messrs. Thomas Fletcher and Co., at 115, Cheapside, London (held for the term of 21 years from the 25th of December, 1890, which is determinable in the option of the Lessees at the end of the first seven or fourteen years of the said term), of the Warehouse, Tenement Buildings, and Premises, at 41, Tabernacle Street, London, occupied by Messrs. W. & A. C. Russell and Co. (held for the residue of a term of ten years from the 25th day of December, 1884), and of the Warehouse and Buildings situate and being No. 24, Tabernacle Street, London, occupied by Messrs. W. & A. C. Russell and Co. (held for a term of ten years from the 25th day of December, 1884), and of the Warehouse and Buildings situate and being No. 77, Queen Victoria Street, London, occupied by Messrs. W. & A. C. Russell and Co. (held for the term of seven years from the 24th day of June, 1891, determinable by the Lessees at the end of the third or fifth years of the said term), at the rents and subject to the covenants and agreements affecting the same.

The Company will also acquire the Goodwill, Trade Marks, and the Vendors' interest in all Patents used in the said businesses.

The Capital necessary for the acquisition and working of the combined businesses is estimated by Messrs. Thomas, Wade, Guthrie, and Co. to be as follows :—

Purchase-money of Works, Goodwill, Machinery, Trade Marks, Stock, &c.	£160,000
For Working Capital and Contingencies	10,000
	£170,000

The books of the two concerns (which have been highly successful from their foundation, and have been closely connected in business relations for many years) have been examined as to Messrs. T. Fletcher and Co.'s books, by Messrs. Harmood Banner and Son, Chartered Accountants, Liverpool; and as to Messrs. W. & A. C. Russell and Co.'s books, by Messrs. Thomas, Wade, Guthrie, and Co., Chartered Accountants, Manchester, during the periods stated below :—

Thomas Fletcher and Co., 3½ years ending the 31st of August, 1891.
W. & A. C. Russell and Co., 3 years and 5 months ending the 31st of August, 1891.

The certificate shows that the average aggregate profits without depreciation amounted to £25,877 3s. 4d. per annum. (See certificate below.)

Worked out upon the Capital of the Company, these Profits would show the following results :—

Joint profits, as per Accountants' Certificate (without depreciation)		£25,877	3	4
Allowed for Depreciation on the values at which the Properties are acquired by the Company	£3000			
Managing Directors' Salaries, and Incidental Payments	2600			
		5600	0	0
		£20,277	3	4
Interest on £50,000 Debentures, at 5 per cent. . .		2500	0	0
Leaving for Appropriation . .		£17,777	3	4

A dividend of 6 per cent. on £50,000 Preference Shares would require	£3000		
A dividend at 10 per cent. on £70,000 paid up on Ordinary Shares would require . .	7000		
		10,000	0 0
Leaving available for Managing Directors' Extra Remuneration, Reserves, and Further Dividends		£7777	3 4

The Vendors have agreed to act as Managing Directors for a period of Five years at a Salary of £500 each per annum; and they will also receive a further remuneration of one-fifth of one-third part each of the surplus Profits after paying a Dividend of 10 per cent. on the Ordinary Shares; and they have also entered into an Agreement with the Company not to carry on, or be interested in, any competing business during the period of Five years after they respectively shall cease to be Managing Directors.

The Vendors will pay all the expenses of formation, except the cost of preparing, printing, and registering the Memorandum and Articles of Association of the Company, which will be paid by the Company.

The following Agreements have been entered into, and all applicants for shares and debentures shall be deemed to have had notice of the terms thereof:—

(*a*) An Agreement dated the 21st day of January, 1892, and made between Thomas William Fletcher and Alfred Clare of the first part; William Russell, Alexander Cockburn Russell, and Alexander Neil of the second part.

(*b*) An Agreement dated the 8th day of February, 1892, and made between the said Thomas William Fletcher and Alfred Clare of the first part, the said William Russell, Alexander Cockburn Russell, and Alexander Neil of the second part, and James Fairclough Dutton of the third part, for the sale to the Company of the businesses and property before described.

(*c*) An Agreement dated the 19th day of February, 1892, and made between the said Thomas William Fletcher and Alfred Clare of the first part, the said William Russell, Alexander Cockburn Russell, and Alexander Neil of the second part, the said James Fairclough Dutton of the third part, and the Company of the fourth part, adopting the last-mentioned agreement on the part of the Company.

In addition to the above-mentioned agreements, there are various trade contracts; and all applicants for Shares shall be deemed to have had notice of these contracts or engagements, and to have waived all right to any particulars thereof, whether under Section 38 of the Companies Act, 1867, or otherwise.

Copies of the Memorandum and Articles of Association, and of the above-mentioned Agreements, Valuations, and Certificates of Accountants, may be inspected at the Offices of the Solicitors of the Company.

Applications for Shares and Debentures must be made on the forms accompanying the prospectus, and forwarded, together with the Deposit, to the Company's Bankers.

Allotments will be made as soon as possible after the list is closed. In cases where no allotment is made, the deposit will be returned in full, and where the amount allotted is less than that applied for, the surplus will be credited in reduction of the amount payable on allotment.

Prospectuses and forms of application may be obtained from the Bankers, Solicitors, and Auditors, or at the Offices of the Company.

Feb. 19, 1892.

The following is a Copy of the Valuers' Certificate.

WE, THE UNDERSIGNED, having been appointed to value all and several the Land and Buildings, Motive Power, Steam, Water, and Gas Piping, Fixed and Loose Plant, Trade Fixtures, Office Furniture, Patterns, Drawings, Patents, Trade Marks, and Registrations of Designs, &c., in, upon, and comprising the Works, the property of MESSRS. THOMAS FLETCHER and CO., situate in Thynne Street, WARRINGTON, do hereby certify that we have carefully inspected and valued the same, and have also verified the stock of materials and saleable goods, and approved the prices attached thereto, as also the contents of the Office and Show-Room situate at 115, Cheapside, London, E.C.; and that we have also valued in like manner the Land and Buildings, Motive Power, Steam, Water, and Gas Piping, Fixed and Loose Plant, Trade Fixtures, Office Furniture, Horses, Carts, &c., Patterns, Drawings, Patents, Trade Marks, and Registration of Designs, in, upon, and comprising the Works known as the SCOTIA FOUNDRY, situate at Seedley, near Manchester, the property of MESSRS. W. & A. C. RUSSELL and CO., and have also verified the stock of materials and saleable goods, and approved the prices attached thereto, as also the contents of the Warehouse and Show-Room, situate in Tabernacle Street, and 77, Queen Victoria Street, London, E.C., and find the sum of EIGHTY-EIGHT THOUSAND SEVEN HUNDRED AND FIFTY-ONE POUNDS THREE SHILLINGS to be the combined total value thereof, taken as current going concerns as at the 31st day of August, 1891.

£88,751 3 0

(Signed) WHEATLEY KIRK, PRICE, AND GOULTY,
Valuers,
Manchester and London.

Nov. 4, 1891.

The following is a Copy of the Accountants' Certificate.

71, *King Street, Manchester,*
Feb. 5, 1892.

TO THE DIRECTORS OF MESSRS. FLETCHER, RUSSELL, AND CO., LIMITED.

DEAR SIRS,

We have had placed in our hands a report by Messrs. Harmood Banner and Son, of Liverpool, Chartered Accountants, upon the Accounts and Profits of the business of Messrs. Thomas Fletcher and Co., Gas-Stove Manufacturers, Warrington, from the 1st of March, 1888, to the 31st of August, 1891, a period of three and a half years; and we have ourselves examined the Books and Accounts of the business of Messrs. W. & A. C. Russell and Co., Ironfounders, of Pendleton, Manchester, from the 31st of March, 1888, to the 31st of August, 1891, a period of three years and five months, and find the joint aggregate Profits, without charging Depreciation, to have been, in the respective periods named, the sum of £89,556 8s. 7d., which is at the average rate per annum of £25,877 3s. 4d.

We hereby certify accordingly.

Your obedient Servants,
(Signed) THOMAS, WADE, GUTHRIE, AND CO.

FRIEDRICH LUX, Ludwigshafen am Rhein; and at No. 142, Great Portland Street, London, W.

LUX's Gas Regulators for every consumption.
LUX's single-stem Pressure-Gauges.
LUX's Regulator for Gas-Engines.
LUX's Gas-Balance.
LUX's new Gas Regulator for Inverted Lamps; and other Apparatus for Gas Lighting, &c.

LIQUOR and Tar wanted.
BROTHERTON AND CO., Ammonia and Tar Distillers, LEEDS and WAKEFIELD.

WANTED, a Situation as Draughtsman or CLERK OF WORKS. First-class references.
Address No. 2068, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Gas Manager, the MANAGEMENT of a GAS-WORKS, making 30 to 40 Millions, at home or in the Colonies. Thoroughly practical in Gas, Water, and Electric Light. Good testimonials and references.
Address No. 2069, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a thorough Gas-Fitter, accustomed to Inside and Outside Work, Main and Service Laying, Indexing, and Smithing. Total Abstainer preferred.
Applications, by letter only, stating age (28 to 40), previous employment, and wages required, to be addressed to Mr. W. B. MIMMACK, Gas-Works, St. Mary Cray, KENT.

WORKS FOREMAN.

WANTED, at the Lancaster Corporation Gas-Works, a thoroughly practical Man as WORKS FOREMAN. Must be a good Carbonizer, and experienced in the management of Workmen. Constant employment to a thoroughly good and steady man. A good Mechanic preferred. Wages £2 2s. per week.
Apply, in own handwriting, stating experience, with two recent testimonials, on or before the 27th inst., to
C. ARMITAGE,
Engineer.

WANTED, Foreman for Provincial Gas- Works making 60 millions. Must be a steady, sober, trustworthy man, good Carbonizer and Mechanic, and possess such knowledge of general routine as to be fully capable of maintaining order, and properly conducting the Works in the absence of the Manager. House near Works provided.
Applications, in candidate's own handwriting (with copies of references in first instance), stating experience, age, and wages expected, to be sent at once to No. 2070, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

HAWORTH LOCAL BOARD OF HEALTH.

THE above Local Board are prepared to receive TENDERS for the purchase of surplus TAR and AMMONIACAL LIQUOR from March 26, 1892, to March 25, 1893, delivered on Rails at Haworth Railway Station.
Tenders, marked "Tar and Liquor Tender," to be sent to me, the undersigned, not later than Thursday, Feb. 25, 1892.
WM. ROBERTSHAW,
Clerk to the Board.
5, Temple Street, Haworth.

MESSRS. DEBENHAM, TEWSON, FARMER, and BRIDGEWATER'S MONTHLY LIST of Shops, Show-Rooms, Factories, and Waterside Premises, suitable for the Exhibition and Manufacture of Engineering and other Appliances, may be obtained, free of charge, at their Offices, 80, CHEAPSIDE, E.C.

OXIDE OF IRON FOR GAS PURIFICATION.

JAMES GORDON & Co., Brokers, can offer Cargoes of good quality; also 300 tons of SPENT OXIDE.
Samples and price on application.
Address Borough Buildings, 7, Rumford Street, LIVERPOOL.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors, for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings, at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER, LINCOLN."

GAS Purification Company's Shares. A small lot TO BE SOLD by an Executor.
Apply, by letter, to No. 2073, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BY PUBLIC AUCTION.

THE Llanberis Gas-Works will be offered FOR SALE as a going concern, at the Royal Hotel, Carnarvon, on March the 5th next, at 1.30 p.m. Freehold.
For particulars apply to the Gas-Works, LLANBERIS.

INVERNESS CORPORATION GAS-WORKS.

THE Inverness Gas Commissioners are prepared to receive TENDERS for the erection of a CAST-IRON TANK, 102 feet in diameter, and a TELESCOPIC GASHOLDER, 100 feet in diameter and 25 feet deep.
Also for a set of four PURIFIERS, 20 feet deep by 15 feet, and LIFTING APPARATUS.
Drawings and Specifications may be seen, and all information obtained, by applying to the Gas Manager.
Tenders, properly endorsed, and addressed to Kenneth MacDonald, Clerk to the Commissioners, will be received up to Monday, the 29th inst.
The Commissioners do not bind themselves to accept the lowest or any tender.
Gas-Works, Inverness,
Feb. 10, 1892.

BOROUGH OF MACCLESFIELD.

THE Gas Committee are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR made at their Works during the Twelve Months or Two years commencing the 1st day of May next.
Tenders, for both One or Two years, and for the Tar or Liquor separately, to be sent in not later than Saturday, the 27th of February, 1892, addressed to the Chairman of the Gas Committee, Town Hall, Macclesfield, and endorsed "Tender for Tar, &c."
For conditions, apply to Mr. Ford, Engineer, Gas-Works, Macclesfield.
The Committee reserve to themselves the right of accepting any tender for the Tar or Liquor separately.
The highest or any tender not necessarily accepted.
W. FREDK. TAYLOR,
Town Clerk.
Feb. 8, 1892.

WELLINGBOROUGH GASLIGHT COMPANY, LIMITED.

TENDERS are invited for the purchase of surplus TAR for One, Two, or Three years.
Particulars on application.
S. H. KIMBELL,
Secretary.

COCKERMOUTH LOCAL BOARD.

THE Gas Committee invite Tenders for the Surplus TAR and AMMONIACAL LIQUOR to be produced at their Works during the Twelve months commencing the 1st of April next.
Tenders, endorsed "Tar and Liquor," to be sent in not later than the 3rd of March next.
ER. W. SMITH,
Manager.
Feb. 19, 1892.

FYLDE WATER-WORKS COMPANY.

£20,000 FOUR PER CENT. PREFERENCE STOCK, 1891.

TENDERS are invited for the above STOCK, in lots of £100 each.
Tenders to be received not later than Monday, the 7th of March, 1892.
Applicants may tender for more than one lot.
For Form of Tender and full particulars, apply to
C. ARTHUR,
Secretary.
Head Office: Kirkham, Lancashire,
Feb. 5, 1892.

BOROUGH OF BURTON-UPON-TRENT.

THE Mayor, Aldermen, and Burgesses of the Borough of Burton-upon-Trent, acting by the Council, invite TENDERS for the supply, construction, and erection of a SULPHATE OF AMMONIA PLANT, exclusive of Buildings, capable of dealing with the production of from 30 to 35 tons of Ammoniacal Liquor per 24 hours.
Persons tendering must submit with their tenders detailed Drawings and Specification, and must state where similar Plant has been erected.
Sealed tenders, endorsed "Sulphate of Ammonia Plant," are to be delivered to me at or before Ten a.m. on Saturday, the 27th of February inst.
The Council do not bind themselves to accept the lowest or any tender, nor will they pay any expense or charge relating to the making or delivery of the same.
F. L. RAMSDEN,
Manager and Engineer.
Gas-Works, Burton-upon-Trent,
Feb. 12, 1892.

BRENTFORD GAS COMPANY.

SALE BY TENDER OF £30,000 NEW STOCK, 1881.

IN Pursuance of the Brentford Gas Order, 1881, NOTICE IS HEREBY GIVEN that it is the intention of the Directors of this Company to SELL by TENDER, £30,000 of NEW STOCK, 1881, of the Company, to be paid up in full on or before the 1st day of April next, such Stock being a portion of additional Capital authorized to be raised by Resolutions passed at an Ordinary Meeting of Proprietors, held on the 21st day of February, 1890, under the powers of the above mentioned Order.
Particulars and conditions of tender may be obtained on application at this Office, and sealed tenders must be sent in not later than Twelve o'clock Noon on Monday, the 14th day of March next.
By order,
WM. CROXFORD, Secretary
Office, Brentford Gas Company, Brentford,
Feb. 15, 1892.

NINTH YEAR. Now Ready (Demy 8vo., Price 5s. 6d. post free),

THE COMPLETE REPORTS OF THE PROCEEDINGS
OF THE VARIOUS
DISTRICT ASSOCIATIONS OF GAS MANAGERS
For 1891,

Forming a Companion Volume to the Transactions of The Gas Institute, with which it is uniform in size.

*** THE VOLUMES for 1883 to 1890 ARE STILL ON SALE.

LONDON: WALTER KING 11, BOLT COURT FLEET STREET, E.C.

NOW READY. PRICE ONE GUINEA.

PRECEDENTS IN PRIVATE BILL LEGISLATION AFFECTING GAS & WATER UNDERTAKINGS.
1879-1890.

Compiled by EDMUND HERBERT STEVENSON, M. Inst. C. E., F. S. I., and EDWARD KYNASTON BURSTAL, M. Inst. C. E., M. Inst. Mech. E.

This Work (which is a continuation of that published in 1879 by the late Mr. G. W. Stevenson) contains information as to the practice of Parliament during the past twelve years, in regard to most of the points on which differences arise in Opposed Bills for Gas and Water Undertakings. The greatest care has been taken in its compilation; and it is arranged in a very handy form.

***The Work by the late Mr. G. W. Stevenson is still on sale, price One Guinea.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

SHEFFIELD UNITED GASLIGHT COMPANY.

EFFINGHAM STREET STATION.
TO IRONFOUNDERS, ETC.

THE Directors of this Company invite TENDERS for the supply and erection of Six PURIFIERS, each 34 ft. by 19 ft., together with Wrought-Iron Covers, Lifting Gear, Valves, and Connections; and also Cast-Iron Girders and Columns to form Floor for carrying the same.

Drawings and Specification may be seen, and Bill of Quantities obtained, upon application to the Engineer, Mr. Fletcher W. Stevenson.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for Purifiers," and addressed to the undersigned, must be delivered at the Company's Offices, by post, not later than Saturday, March 5 next.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Feb. 12, 1892.

SHEFFIELD UNITED GASLIGHT COMPANY.

GRIMESTHORPE STATION.
CONTRACT No. 6.
TO GASHOLDER MANUFACTURERS.

THE Directors of this Company invite TENDERS for the construction and erection of a FOUR-LIFT GASHOLDER and WROUGHT-IRON GUIDE-FRAMING. The Lifts of the Gasholder will average 145 feet diameter by 29 feet deep.

TENDERS are also invited for a second GASHOLDER, which will be in all respects similar to the first.

The first Gasholder to be completed by June 30, 1893; and the second, by Aug. 31, 1893.

Drawings and Specification may be seen, and Bill of Quantities obtained, upon application to the Engineer, Mr. Fletcher W. Stevenson.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for Gasholders," and addressed to the undersigned, must be delivered at the Company's Offices, by post, not later than Saturday, March 5 next.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Feb. 12, 1892.

SHEFFIELD UNITED GASLIGHT COMPANY.

GRIMESTHORPE STATION.
CONTRACT No. 7.

THE Directors of this Company invite TENDERS for the construction of a CONCRETE and BRICK GASHOLDER TANK (No. 2), 152 feet diameter and 30 feet deep, &c.

Drawings and Specification may be seen, and Bill of Quantities obtained, upon application to the Engineer, Mr. Fletcher W. Stevenson.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for Gasholder Tank," and addressed to the undersigned, must be delivered at the Company's Offices, by post, not later than Saturday, March 5 next.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffie'd,
Feb. 12, 1892.

SHEFFIELD UNITED GASLIGHT COMPANY.

GRIMESTHORPE STATION.
CONTRACT No. 8.
TO IRONFOUNDERS, ETC.

THE Directors of this Company invite TENDERS for the supply and delivery of IRONWORK required in the construction of No. 2 Gasholder Tank and Framing.

Bill of Quantities may be obtained, and the Drawings may be seen, at the Company's Offices, upon application to the Engineer, Mr. Fletcher W. Stevenson.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked "Tender for No. 2 Gasholder Tank," and addressed to the undersigned, must be delivered at the Company's Offices, by post, not later than Saturday, March 5 next.

HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield,
Feb. 12, 1892.

BY ORDER OF THE EXECUTORS OF THE LATE J. J. KEILY, ESQ.

Seventy £10 Original Fully-paid Shares, and 35 Additional £10 Shares (£4 paid) in the West Kent Gas Company, paying Dividends of 10 and 7 per cent. respectively, in numerous lots.

MESSRS. BROAD and WILTSHIRE will SELL by AUCTION, at the Mart, Tokenhouse Yard, E.C., on Monday, Feb. 29, at Two o'clock precisely, 70 £10 ORIGINAL FULLY-PAID SHARES and 35 ADDITIONAL £10 SHARES (£4 paid) in that well-established Undertaking known as the West Kent Gas Company, which pays the maximum authorized Dividend of 10 and 7 per cent. on the respective classes of Shares.

The Company supplies large and rapidly increasing Districts; and its Shares may be considered as offering to the public a thoroughly sound investment.

Particulars at the Mart; of Messrs. WETHERFIELD, SON, AND BAINES, Solicitors, 1, Gresham Buildings, BASINGHALL STREET, E.C.; or of the AUCTIONEERS, 7, Queen Street, CHEAPSIDE, E.C.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97 WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on application.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is hereby given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the "Bell Hotel," Bromley, Kent, on Thursday, the 25th day of February inst., at Six o'clock precisely, to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, to declare Dividends, and for General Business.

The Transfer Books will be closed from the 12th to the 25th of February, 1892, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices: At the Works, Bromley,
Kent, Feb. 10, 1892.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is hereby given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors in the Company, will be held at the Company's Offices, Willoughby Lane, Tottenham, on Saturday, the 27th day of February inst., at Three o'clock in the Afternoon precisely, to receive the Report of the Directors, the Statement of Accounts for the Half Year ended the 31st of December, 1891, to declare Dividends, and to transact such other Business as the Act of Parliament directs.

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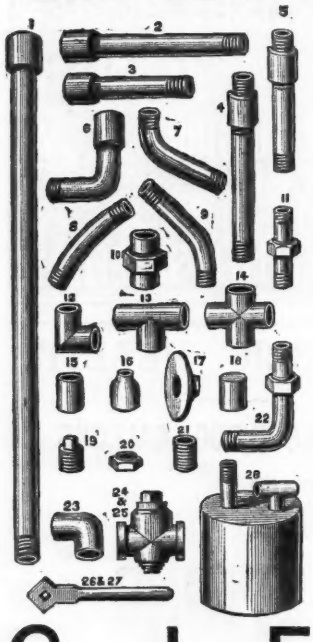

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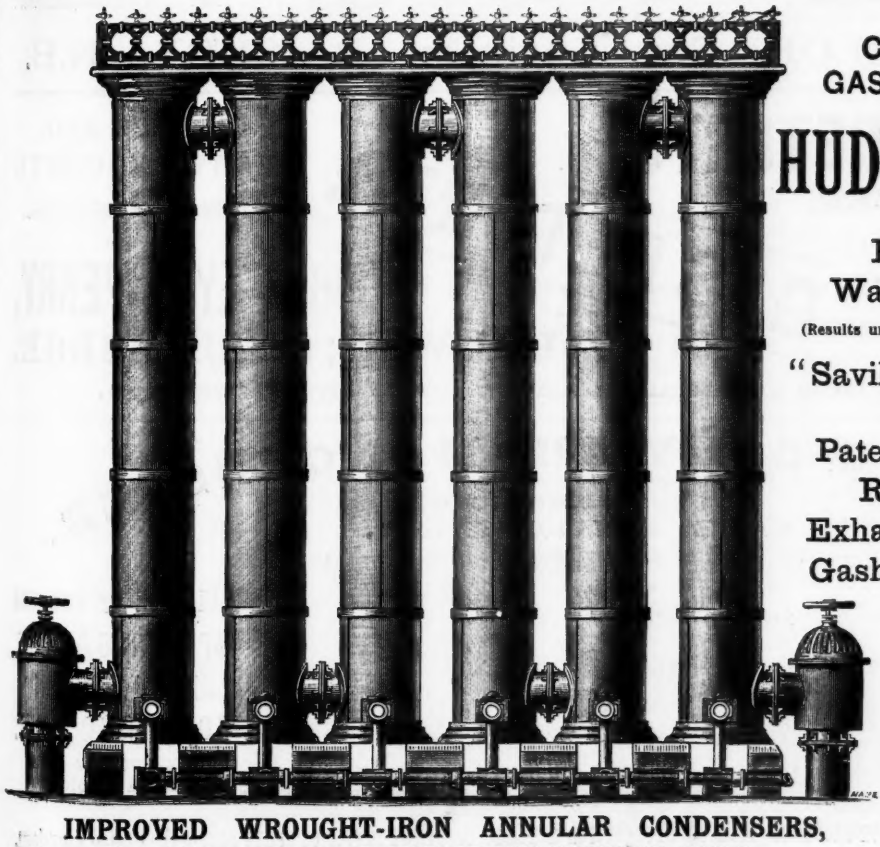

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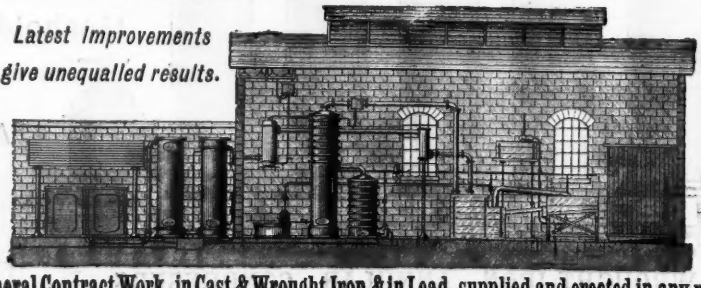

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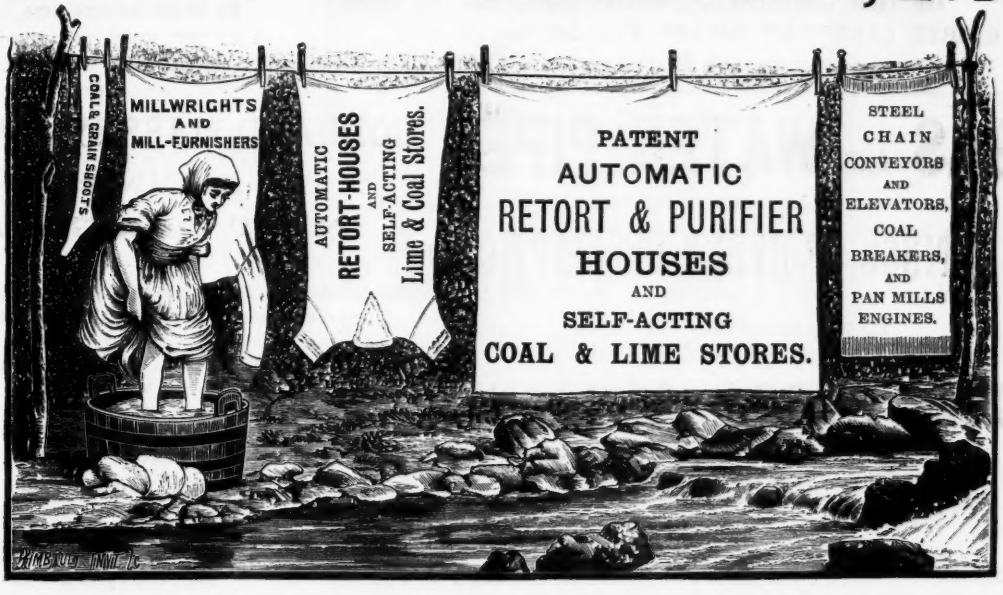
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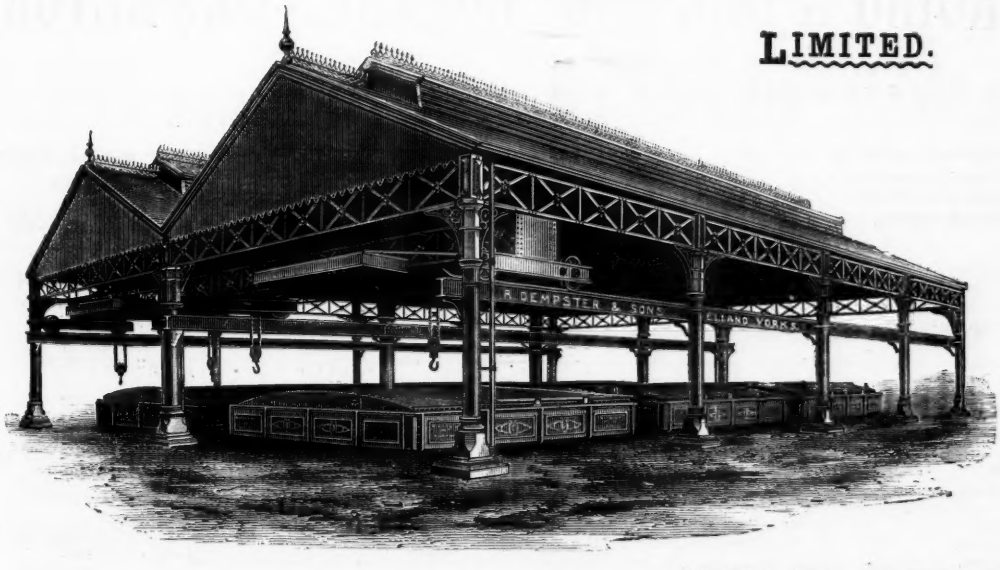

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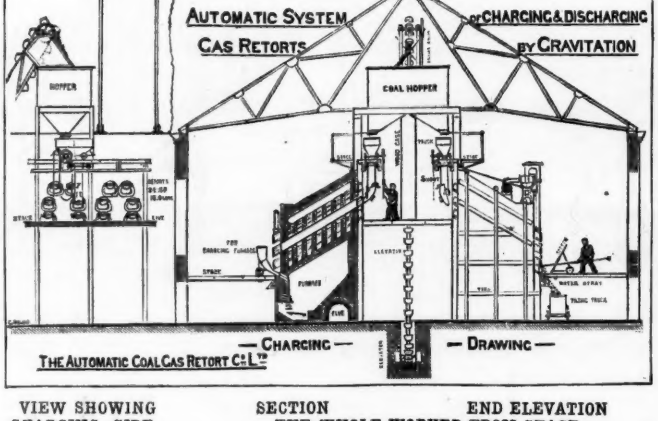

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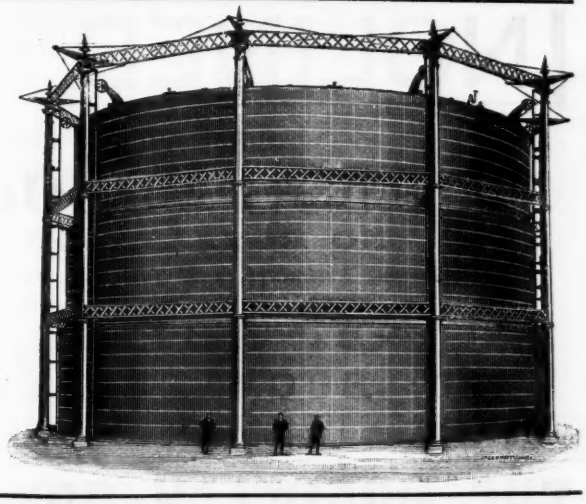

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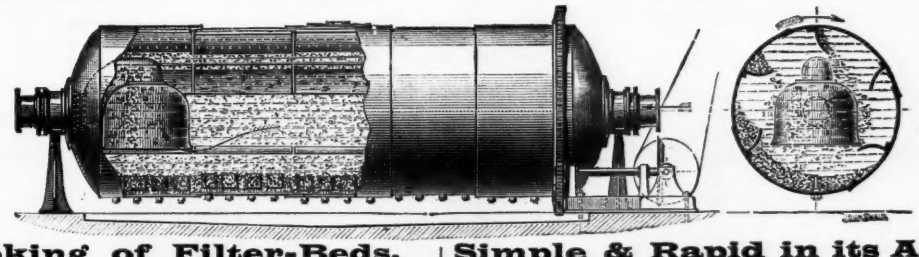

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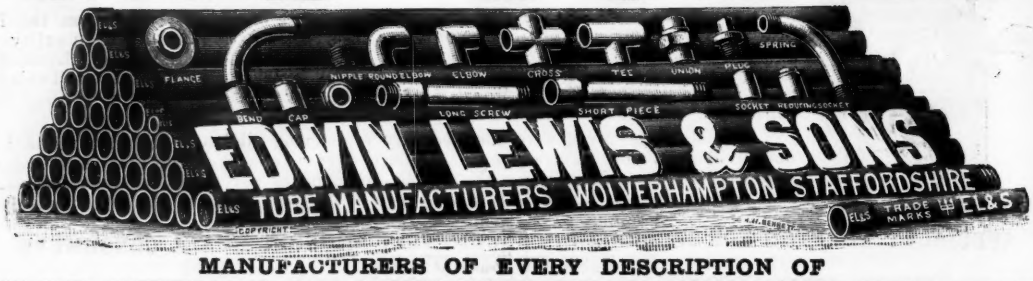

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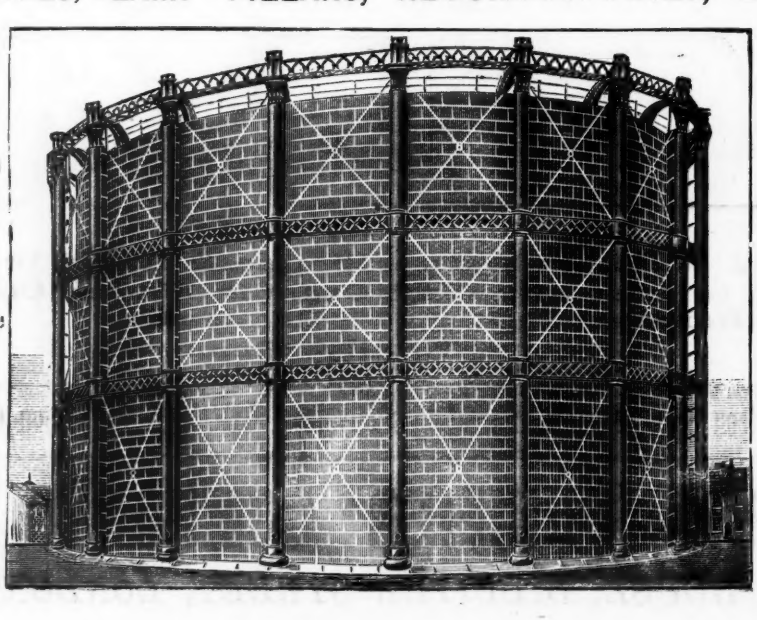

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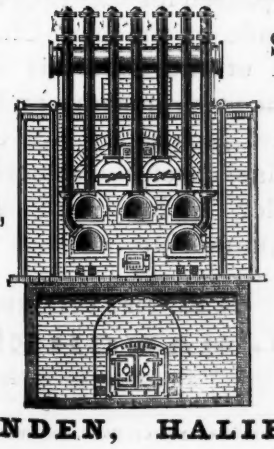

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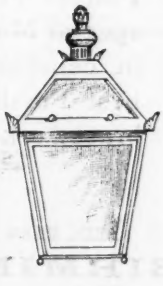

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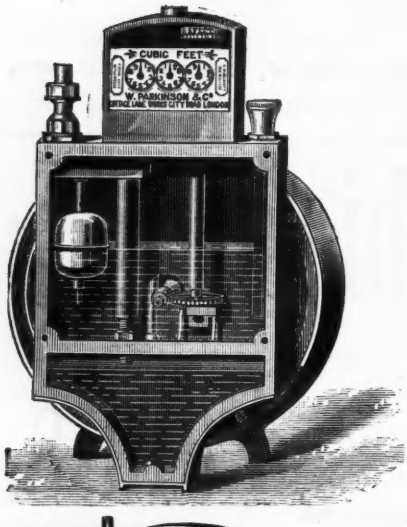

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Work with very little friction. Will stand very high pressures. Cannot possibly be shut off by sudden increase of pressure, the Float being affected by Outlet Gas only. Allow for loss of water by evaporation without materially affecting the registration or shutting off the gas. Unexcelled for simplicity of construction, excellence of workmanship, or accuracy in registration.

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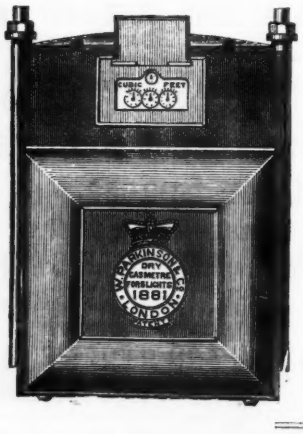

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[See also Advt. p., 330.

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